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## Some Practical Aspects of Artificial Insemination*


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DARTINGTON HALL CATTLE BREEDING CENTRE, TOTNES


A great deal of literature has been forthcoming in the last decade on matters relating to artificial insemination; the sifting of this knowledge and its application in practice has permitted the establishment of commercial artificial insemination centres, the number of which is rapidly increasing in this country. I propose to tell you something, not of the routine of the centre's work, but rather some of its more interesting aspects.

As you know, the duties of a centre consist essentially of the collection, dilution and distribution of semen. Its purpose is to get cows in calf to good bulls and its aim is livestock improvement.

The organization of a centre rests with the veterinary officer in charge and it is his responsibility to build up a system and routine of working which is simple and foolproof and yet sufficiently elastic to allow changes in emergencies without risking the failure of the service, for a centre cannot allow lack of confidence to develop amongst its members. This means, of course, that the service must continue without break even for one day, since inseminations cannot be postponed. Contrary to popular belief, the work of the officer in charge is far from monotonous, having to contend with transport breakdowns, shortages of semen and staff difficulties, to mention a few troubles, as well as giving constant attention to technical detail, record keeping and checking conception rates. To meet these problems, then, efficiency is demanded, not only in organization, but also in buildings, bull management, technical work and record keeping.

There are various types of buildings in use for A.I. centres. Some are new; others are reconverted, though I have not yet seen the ideal layout. This, I believe, consists of a single, long, narrow building with bull-pens along each side, and a wide central passage with sliding doors at each end, opening into the forage store and manure pit. The office and laboratory should be situated at either side of the main entrance, which is centrally placed along one side. The collection crate is opposite the main entrance. By this arrangement the unit is compact: the laboratory is close to the service crate and the office can be reached by visitors without having to pass any bull-pens and possibly carry infection. Economy of labour, ease of cleaning, along with safe and effective handling of bulls are facilities which all buildings should provide. I believe it is a distinct advantage for bulls to have access to grazing and this can be provided for by individual paddocks which each bull can reach by a door from his pen. If this door is horizontally hinged at the top the bull can walk through and the door falls to behind him. He can thus come in or go out at will. This system is in use at Dartington and works very well, saving a great deal in labour and feeding-stuffs.

With regard to rations for bulls in relation to semen production, present opinions agree in that the protein equivalent of the ration must be maintained at a reasonably high level. If protein intake falls below a minimum, sperm quality deteriorates. Succulents are valuable in winter in the form of turnips, swedes or silage, but mangolds appear to have a detrimental effect on semen production and are therefore contra-indicated. As in the case of protein, vitamins increase sperm quality up to a point beyond which any further additions have no effect.

Bull management in a centre must be studied. Daily grooming is beneficial both hygienically and in getting the animals used to handling. As far as possible the same man should be employed each day on this duty, for bulls resent strangers. This same stockman should also lead the bulls out for service, which usually takes place at the beginning of the day's work, so that whatever else happens, a supply of semen is available. It is preferable to have a rota of bulls for collection so that each bull is given regular service. The frequency with which collections are taken is determined by the demand for the semen and the number of bulls available, but on the average, each bull should serve once every fifth or sixth day. If the interval is of necessity longer than this, two collections should be taken each time, for the first one may often be of inferior quality. In this respect there is considerable individual variation however and a process of trial and error is necessary in order to discover the optimum length of inter-service rest, for overworking of bulls leads to infertility, but it must also be remembered that conception rates fall if bulls are allowed service too infrequently.

Artificial semen collection has afforded us an opportunity to learn a great deal regarding the behaviour of bulls at service. The psychology of bulls at A.I. Centres is a new and very important avenue which has opened up and calls for further study by the profession. Indeed, it must be studied by officers responsible for semen collection under artificial conditions. There is no doubt that, given wrong conditions for service, a bull may eventually become inhibited and either refuse to serve or produce a poor sample of semen. This inhibition is caused by discomfort associated with service, brought about generally by the improper use of the artificial vagina, particularly with regard to temperature, which may be varied between bulls, but should be constant with each individual: the optimum temperature for each bull can only be discovered by trial and error. These remarks also apply to the pressure inside the A.V., a factor less accurately recorded, but nevertheless of some importance. Too great a deflection of the penis during the actual thrust may cause pain and give rise eventually to an inhibition. The only cure for this condition is prolonged rest followed by a return to natural service for a time.

Inhibition, then, is one cause of failure of bulls to serve. Other causes, less serious, are numerous. What appear to be sexually slothful bulls may sometimes be actually anxious to serve if given the proper conditions; for example, bulls with tender feet will often show no interest in the cow while on a hard surface, but may readily serve on grass. Fear of slipping, pain in joints, presence of a strange collector or a strange stockman are common causes of refusal to serve, and even putting the cow in a service crate will deter some bulls. These facts show, then, how necessary it is for the likes and dislikes of each individual bull to be studied if one is to meet with reasonable success in artificial semen collection.

The number of bulls required by a centre depends upon the number of cows available for service; although this number is variable, one bull for every 1,500 cows would be a reasonable figure at the present time, though it is necessary to have a minimum of three bulls for each breed catered for. It would not appear to be a sound proposition to provide bulls to serve a breed which could not present at least 2,000 cows for service, since the semen for small numbers can easily be imported.

On the technique of collecting may depend the success of the service. It is generally necessary to have the cow either in a service crate or, even better, tied to a post with a large bale of straw at each side of her. The operator stands as close as practicable to the cow, so that when the bull mounts he does not need to move, except to lean forward in order to make a collection. The artificial vagina should be placed at the side of the root of the cow's tail and held there, allowing the bull to move forward towards it. It is important that the sheath of the bull should not be touched until the very last moment before he serves the cow. At this point the penis should be deflected towards the operator and allowed to touch the lining of the A.V. The bull will now thrust if conditions are satisfactory. I believe mistakes are made by collectors, either by grasping the sheath too early or by putting the A.V. on to the penis rather than allowing the bull to come well up on the cow and serve into the artificial vagina himself.

Examination of the semen requires particular attention and there is considerable variation between different samples given by individual bulls. I find that if the bull is not allowed to serve for a moment or two after being led out to the cow, several c.c. of accessory fluids are discarded, and probably as a result of this, better samples are often obtained than where the bulls are allowed to serve immediately. Another reason for variation between individual bulls may lie in the fact that many bulls masturbate, and the quality of the sample probably depends upon the time between masturbation and collection. In volume the ejaculate is approximately 4 to 5 c.c. for an adult bull, though individual variation is considerable. For example, the average quantities for

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two twelve-year-old South Devon bulls at Dartington throughout one year were 11 and 12 c.c. each collection, and one of these gave a record quantity of 23 c.c. of good quality semen in one ejaculation.

In appearance, semen of good quality is creamy-white in colour and flocculent. Under the microscope low power the flocculence appears as waves or currents running through the sample, a salient feature of good quality semen. Microscopic examination of semen should always be done on a thermostatically controlled heated stage so that all samples are examined at the same temperature. In this way, after a little experience, one can set standards of quality on which to base decisions on the various samples.

At one time it was the custom to make sperm counts on each sample of semen but I doubt the value of this and have ceased to make use of it, though a count of the abnormal sperms in each sample is quite a good indication of its quality, 20 per cent. abnormal sperms being regarded as a maximum for most samples, over which figure fertility may be affected.

It is a considerable handicap that up to the present no single test for semen fertility has proved to be absolutely reliable and the most we can say of any sample is that it is probably of high or low fertility, for occasionally samples which appear good in the laboratory prove in practice to be only partially fertile and vice versa. Several adjuncts to microscopical examination have been devised, though most of these are not practicable in a busy commercial centre. The length of life of sperms in an undiluted sample kept in cold storage is useful but this involves storage for one or two days and cannot therefore be applied in a commercial centre. The work of Walton & Edwards [8] on the respiratory rate of sperms, though valuable, involves complicated apparatus not suited to the laboratory of an A.I. centre. The methylene blue test devised by Beck & Salisbury [1] is probably the most practicable and can be done in a few minutes with simple apparatus. Rapid de-colorization of the methylene blue indicates semen of high concentration, good activity and longevity. The tests devised at present are mostly for assessing the activity of spermatozoa, but activity and fertilizing capacity may not necessarily be the same thing for, though sperms must be active in order to fertilize ova, it does not follow that because they are active they possess the power to fertilize.

Dilution of the sample of semen is carried out as soon as possible after the collection and it is this process which really has made A.I. on a large scale a technical possibility. The introduction by Phillips [4] of egg yolk phosphate medium enabled increase of both the quantity of semen and its length of life, but it has the disadvantage that sperms are not readily seen in the dilutor under the microscope. This objection has been removed by the egg yolk citrate medium introduced by Salisbury and his co-workers.[6] There is no difference in conception rates between semen diluted by either of these fluids.

The rate of dilution is increasing steadily. Two years ago one part of semen to three or four parts of diluting fluid was the rule. It is commonplace now to dilute one to 20 and over and provided that good quality semen is used dilution can go up to one to a 100 if 12 to 13 million sperms are inseminated into each cow.[7] This means therefore that 10 c.c. of semen can now be used to produce one litre of diluted semen, sufficient to inseminate 1,000 cows. The quantity of the original ejaculate, therefore, is taking a second place in importance and the need for a reliable means of assessing fertility becomes more pressing. Normally the quantity of semen inseminated is 1 c.c. but it would seem that this amount could be varied considerably and in the future estimation of the number of sperms inseminated into each cow will be the method of determining the standard size of injection; in other words, the dose will be referred to as so many million sperms rather than a certain volume. The high dilution rate also means that a centre will be able to reduce the number of bulls required over the minimum of three. During dilution temperature shock must be avoided and the dilutor and semen should be at the same temperature at the time of mixing. After dilution sudden changes of temperature do not effect semen which is protected by the egg yolk fraction of the dilutor. After dilution the semen is stored at approximately four degrees centigrade, and under these conditions can be kept alive often up to three weeks, though of course not necessarily fertile after this time. Conception rates appear to be satisfactory after storage for six days. This prolongation of fertility and life is a considerable achievement but still further progress is required so that fertile semen from every bull at the centre is available every day. This would enable clients to nominate the bull whose semen they prefer, instead of having to accept that particular bull whose semen the centre happens to have on hand on that particular day.

In the main, inseminations are performed by the intrauterine technique. Intracervical inseminations were favoured in the early stages of development because of the simplicity of the method for use by lay inseminators. This method has now been superseded by the intrauterine method and evidence provided by McMeekan[3] and by myself[2] suggests that this method gives better conception rates. Training of lay inseminators to pass a catheter is undertaken by the veterinary officer of the centre and usually occupies about one month. After this, I find that a further six months of routine inseminations are necessary before the maximum conception rate is reached. It is worth recording that some laymen, although technically perfect, are unable to reach a satisfactory rate of conception and the cause for this is not known.

The number of inseminations which a man can do in a day varies with different districts, according to the density of the cattle populations, accessibility of farms and travelling conditions. In South Devon I find that one man can do an average of seven to eight calls a day. This seems a small number, but, though the time taken for the actual operation is only a matter of a few moments, the travelling time is considerable and at Dartington an average of twelve miles are travelled to do each case. The area which the centre serves again varies with circumstances and as a rule it is ten to 15 miles radius but will be subject to alteration according to the cattle population, transport facilities and staff and bulls available.

Telephone arrangements require consideration and here there is some difference of opinion on the best plan to be adopted. The system at Dartington is that farmers ringing the centre before 1 p.m. will have their cows inseminated the same day. Calls received during the afternoon will be attended to the following morning. Provided that the farmer rings in as soon as possible no cows are missed. Some centres receive calls up to four in the afternoon for attention the same day, but under this system it is not possible to arrange the afternoon's work and I think that some cows may be inseminated too early in heat.

During their work the inseminators collect certain information relating to the cows served. This data is entered on to a record book which each man carries with him. It is collected and transferred into the records at the office. The keeping of full and accurate records is a most essential part of the centre's work and there are several methods in use, all of which have something to recommend them. I myself favour a day to day record of inseminations combined with a card index system of filing. Each cow has a card on to which are entered details of her previous breeding history as well as the details of the inseminations. Eventually, therefore, the breeding life through several years can be read at a glance at that particular card. In addition, a record of all calves born is kept. Calves sired by A.I. should be marked and a register of these ear numbers compiled and issued to each inseminator, so that, by reference to it he can read off the sire of any particular animal and can inseminate with the semen of a bull other than the sire, since two samples of semen would be carried by each man.

From the records it is necessary from time to time to abstract figures and obtain information on the conception rates of the individual inseminators, the various bulls and the different samples of semen used. This information is necessary for the satisfactory running of the centre so that any error or shortcomings can be corrected. There is, however, another side to this question. The information available from these records could be put to a much wider use. A great deal of valuable information is being filed away and forgotten because of an almost complete lack of co-operation and liaison between veterinary practitioners and officers in charge of A.I. centres. For instance, I have to hand information relating to the breeding histories of over 1,000 herds mostly in South Devon and a few in East Cornwall. From these records it is possible to give almost any information which the practitioner requires on the breeding aspects of a client's herd or on any individual cow. It could also be arranged for a centre to keep a record of the results of any particular treatment given by a veterinary surgeon. For my part I would be only too willing to help in this way and I extend to any practitioner an open invitation to make use of this information and these facilities. I feel sure that there is a great opening here for the examination on a large scale of the efficiency of the various treatments for sterility in cows and it should be possible to reduce the incidence of temporary infertility to a mere fraction of its present proportions. Sterility is a big problem for a general practitioner but is even more serious for A.I. centres: to overcome it to some extent most centres agree to carry out three inseminations on any particular cow: if these three services fail no further inseminations are performed until the animal has had veterinary treatment. This is put into practice at Dartington with moderately good results though the real success of this policy rests with the ability of the general practitioner to make full use of the modern methods of diagnosis and treatment.

I think you will agree that brucellosis is the main cause of temporary infertility in this country and it is interesting to note a figure taken from Dartington records: of 189 cows which aborted only 15 held to the first insemination following the abortion, a conception rate of 8 per cent. compared with the average of 55 to 60 per cent. I suggest to you here that a period of temporary infertility sometimes precedes an outbreak of abortion in a herd and I would value your views on this. Vaginitis and cervicitis cases are very common in South Devon and I would like to mention that, though in theory these conditions should not effect conception by intrauterine inseminations, in practice they do, probably by toxins flowing into the uterus or being carried in by the catheter and destroying the sperms.

Now where will the future of artificial insemination lead us? In the administrative field two major developments are taking place. One is the import of semen by a centre to serve cows of a breed for which the centre does not provide bulls; for example, I import Guernsey, Friesian and Shorthorn semen since these are minority breeds in South Devon and do not merit the expense of buying three bulls of each breed. Road, rail or post are the most practicable routes and choice will depend upon the circumstances. The elimination of vibration and the maintenance of temperature at about four degrees centigrade appear to be the chief factors to consider. Carrier pigeons have been used for conveying semen but would not appear to be practicable in this country for regular supplies because of the quantity of semen imported and the vicissitudes of the weather. Import of semen, then, is a first major development in the administrative field and the practice will no doubt develop into a regular interchange of semen between centres, so that every centre will be able to supply to its members the semen of almost any breed of cattle.

The second development is a growth of sub-centres. This involves the export of semen from the main centre to its satellites. The sub-centre is simply a distributing centre for semen and can be run satisfactorily by a layman under the control of the parent centre. The ideal arrangement in this line of development would be to have the main centre surrounded by its various sub-centres, though natural boundaries and distribution of cattle population will cause variations of this plan.

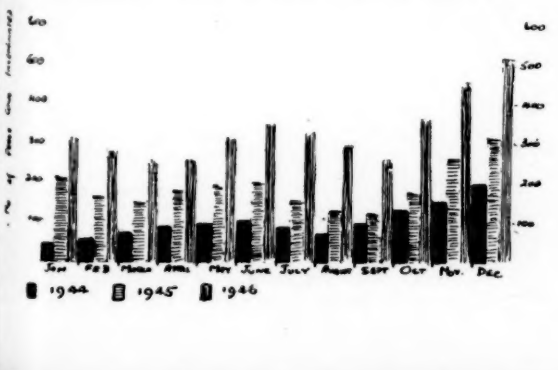
The import and export of semen on a large scale is going to mean that semen of several breeds will be handled in each centre and sub-centre. Under these circumstances there is a risk, however slight, of getting samples mixed up. This danger can be eliminated and future embarrassment avoided by colouring the samples of semen according to the breed. It has recently been found by Phillips[5] that Sudan III, nile blue sulphate and neutral red are dyes which can be used for this purpose. If this method is put to a general use a standard colour for each breed should be made for the whole country.

There is no doubt that A.I. will do a great deal of good in livestock improvement and more milk will be produced from better quality stock. The small farmer will, I hope, make use of his opportunity to grade his herd up to the pedigree standard. An advisory service for calf husbandry is badly needed and could be run in conjunction with A.I. centres.

In the technical field there is need of a good method of assessing male fertility and the storage life of semen must be prolonged. What use will our profession make of the opportunity to collect technical information? Sterility treatment goes hand in hand with A.I. Will this continue to be given by the practitioners or would the logical development be to incorporate sterility treatment in the services offered by the centre? I leave these questions for you to discuss.

In closing it may interest you to hear some figures relating to the work at Dartington. This is a diagrammatic representation of the number of cows inseminated for the last three years.

The total number of first inseminations for 1944, when the centre opened, was 1,129, in 1945, 2,223 and in 1946, 3,964. The black column represents the 1944 figures, the cross shading 1945 and the vertical shading 1946. You will see that there is a steep rise from year to year indicating the rate of growth of the centre. The busiest periods are November, December and January and May, June and July. The conception rate to a first insemination, presumed at three weeks, averaged 80 per cent. in 1946 and this will produce an actual calving conception of approximately 60 per cent. for that year. The total number of calves born up to the end of 1946 was 3,380 and of these 6 per cent. were abortions.




## Some Observations on the Pharmacology of Penicillin in Cattle

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Within the last few years penicillin, the antibiotic derived from the mould *Penicillium notatum*, first described by Fleming in 1929, has been the subject of very active investigation. As a result of much concerted effort, the drug can now be produced in quantity and in a relatively stable form. The pharmacology and therapeutic use of penicillin in the human subject and in experimental animals has been extensively investigated. These investigations have been reviewed recently by Fleming *et al.* (1946).

Because penicillin could, at first, only be produced in limited amounts restrictions were imposed on the use of the drug for veterinary purposes. A small amount of penicillin was made available, however, by the Agricultural Research Council to selected workers for the experimental therapy of bovine mastitis caused by *Streptococcus agalactiae*. As a result of this investigation, it was shown that penicillin infused into the udder would produce a high percentage of bacteriological cures in this condition (A.R.C. Report, 1946), so confirming the original observation of Kakavas (1944).

It is generally regarded as a sound policy that the investigation of the pharmacological action of a drug should proceed at the same pace as investigations into its therapeutic properties. Until very recently, when penicillin has become generally available for veterinary purposes, investigations in this country into the pharmacology of penicillin in the domestic animals have had to be postponed, although the drug has been used extensively in the treatment of streptococcal mastitis by udder infusion.

It is the purpose of this article to report the results of a study of the absorption, distribution and excretion of penicillin in cattle after parenteral administration and infusion into the udder.

### Methods

The amount of penicillin present in the sera and milk was estimated by a modification of the cup-plate technique of Florey *et al.* (1941), described by Beadle *et al.* (1945). The large plates were poured with 250 ml. amounts of nutrient agar at *p*H 6·4 and overpoured with a further 250 ml. of this agar seeded with the Oxford staphylococcus (N.C.T.C. No. 6571A). For seeding purposes 16-hour agar slope cultures were washed off with normal saline and standardized to contain $8{\cdot}5 \times 10^8$ organisms per ml.; 10 ml. of this suspension was added to each 250 ml. of the nutrient agar. After the agar had set, plugs 8 mm. in diameter were removed from the seeded layer by means of suction through a sterile cork-borer. The penicillin titre for each sample of milk or serum was obtained by comparing the average of eight readings with the average of eight readings of the diameters of the zones of inhibition produced by standard solutions of penicillin on the same plate.

The animals used in these tests were normal lactating or dry Ayrshire cows kept under normal management.

### Parenteral Administration

#### 1. *Aqueous solutions*

The drug was made up in all cases to a volume of 20 ml. in sterile distilled water and injected with aseptic technique subcutaneously behind the right shoulder. Blood samples were taken aseptically from the jugular vein at intervals as stated in the tables, allowed to clot and the serum removed.

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5 ———. (1945.) *J. Dairy Sci.* **28.** 843.
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8 Walton, A., & Edwards, J. (1938.) *J. Proc. Amer. Soc. Anim. Prod.* Thirty-first annual meeting. 254.

TABLE I

PENICILLIN BLOOD LEVELS AFTER SUBCUTANEOUS INJECTION OF SODIUM PENICILLIN

| Time after administration | Amount of penicillin in mega units injected in 20 ml. distilled water | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 0·5* | 0·5 | 1·0 | 1·0 | 2·0 | 2·0 | 5·0 | 5·0 |
| 15 minutes | 0·54† | 1·05 | — | 1·85 | — | 0·58 | 0·36 | 0·82 |
| 20 minutes | 0·38 | — | — | — | — | 0·86 | 0·84 | 0·80 |
| 45 minutes | 0·48 | 0·66 | — | — | — | 0·80 | 1·00 | 0·60 |
| 1 hour | 0·46 | Tr. | 0·38 | 1·70 | 1·95 | 0·86 | 1·10 | 0·78 |
| 2 hours | Tr. | Nil | 0·13 | 0·78 | 0·66 | 0·68 | 1·20 | 0·75 |
| 3 hours | Nil | | Tr. | 0·76 | 0·66 | 0·49 | 0·80 | 1·90 |
| 4 hours | | | Tr. | 0·76 | 0·36 | — | — | 0·80 |
| 5 hours | | | Nil | 0·46 | Tr. | Tr. | 0·59 | 0·76 |
| 6 hours | | | | Nil | Nil | Tr. | 0·37 | 0·66 |
| 7 hours | | | | | | Nil | Tr. | Tr. |
| 24 hours | | | | | | | Nil | Nil |

* Each column refers to a single animal.
† Units of penicillin/ml.

TABLE II

PENICILLIN BLOOD LEVELS AFTER SUBCUTANEOUS INJECTION OF CALCIUM PENICILLIN

| Time after administration | Amount of penicillin in mega units injected in 20 ml. distilled water | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 0·5* | 0·5 | 1·0 | 1·0 | 2·0 | 2·0 | 5·0 | 5·0 |
| 15 minutes | 0·54† | 0·31 | 0·40 | 0·48 | 0·56 | 0·90 | 0·76 | 1·20 |
| 30 minutes | 0·84 | 0·34 | 0·54 | 0·40 | 0·88 | 1·10 | 1·1 | 1·30 |
| 45 minutes | 0·66 | 0·23 | 0·62 | 0·42 | 0·78 | 1·00 | — | 1·40 |
| 1 hour | 0·66 | — | 0·72 | — | 0·78 | 0·82 | 1·3 | 1·30 |
| 2 hours | Tr. | 0·16 | 0·62 | 0·33 | 0·78 | 0·62 | 0·72 | 1·35 |
| 3 hours | Nil | Nil | Tr. | 0·27 | 0·78 | 0·54 | 0·65 | 1·05 |
| 4 hours | | | Nil | 0·20 | 0·70 | — | 0·37 | 1·10 |
| 5 hours | | | | Tr. | 0·50 | 0·48 | 0·37 | 0·80 |
| 6 hours | | | | Nil | 0·74 | 0·31 | 0·36 | 0·56 |
| 7 hours | | | | | 0·46 | Tr. | 0·36 | 0·15 |
| 24 hours | | | | | Nil | Nil | Nil | Nil |

* Each column refers to a single animal.
† Units of penicillin/ml.

The results are shown in Tables I and II, from which it can be seen that the penicillin was rapidly absorbed in all cases. A high blood level was obtained 15 minutes after administration, the highest concentration occurring within an hour in most cases. The maintenance of a detectable penicillin concentration in the blood stream appears to vary directly with the amount of penicillin administered.

In doses of 0·5 mega units excretion was complete within three hours while after the administration of 5·0 mega units of the sodium salt of penicillin only a trace was detectable after seven hours. Injections of the calcium salt behaved similarly to those of sodium penicillin but the excretion of the calcium salt of penicillin was somewhat delayed; this was possibly due to the fact that the calcium penicillin was of low potency (438 u./mg.), so that in the higher dosage levels complete solution was not possible. The relatively large amount of extraneous material found in this less refined product possibly inhibited the absorption of the penicillin.

In no case did any of the cows show a systemic reaction after injection of the drug. In only one case was a local reaction produced —when the injection of 5 mega units of calcium penicillin caused a painful swelling within a few hours which subsided after two days.

2. *In other vehicles*

When it was ascertained that the blood concentration of penicillin in the ox fell rapidly within a few hours after parenteral administration of aqueous solutions, it became apparent that repeated injections at frequent intervals would be necessary to maintain a blood concentration of therapeutic value. Attention was therefore directed to methods whereby a therapeutic blood level could be maintained after a single injection.

Clinical workers have noted that there was a significant prolongation of the therapeutic blood level in patients with renal impairment treated with penicillin. It has been demonstrated that partial blocking of the renal excretion of penicillin could be effected by the simultaneous injection of diodrase (dioxone) (Rammelkamp and Bradley, 1943), by para-aminohippuric acid (Beyer *et al.*, 1945), and by benzoic acid (Bronfenbrenner & Favour, 1945). These methods present a number of technical difficulties, for example, large injections at frequent intervals are necessary, benzoic acid is relatively toxic for cattle. They must, therefore, be considered to be outside the bounds of normal veterinary application.

Romansky and Rittman (1945) reported that the blood level of penicillin could be prolonged by a single injection of penicillin dispersed in a vehicle of beeswax and peanut oil. It was suggested that this method depends upon the production of a "depot" of penicillin from which absorption is delayed so that a relatively high blood level is maintained for a considerable period. Such a preparation might be of some value in the penicillin therapy of veterinary patients when it is difficult to make repeated injections of aqueous solutions.

The blood level of penicillin after administration of various amounts of sodium penicillin (first dissolved in the minimum amount of distilled water) in arachis oil containing 2·5 per cent. beeswax v/v to make a final volume of 20 ml., are shown in Table III.

TABLE III

PENICILLIN BLOOD LEVELS AFTER SUBCUTANEOUS INJECTION OF SODIUM PENICILLIN

| Time after administration | Amount of penicillin in mega units injected in 20 ml. of vehicle | | | | | |
|---|---|---|---|---|---|---|
| | Arachis oil + 2½ per cent. beeswax | | L.S.F. | | | |
| | 1·0* | 2·0 | 1·0 | 2·0 | 5·0 | 5·0 |
| 15 minutes | 0·48 † | 0·62 | Nil | 0·44 | — | — |
| 30 minutes | 0·46 | 0·64 | Nil | — | 0·67 | 1·70 |
| 45 minutes | 0·50 | 0·88 | Nil | 0·81 | — | — |
| 1 hour | 0·64 | 3·70 | Nil | 1·29 | 0·65 | 1·50 |
| 2 hours | 0·43 | 1·25 | Nil | 0·79 | 0·61 | 1·00 |
| 3 hours | 0·29 | 0·68 | Nil | — | 0·84 | — |
| 4 hours | Tr. | 0·84 | Nil | 0·54 | 0·73 | 0·53 |
| 5 hours | Nil | Tr. | Nil | Tr. | 0·69 | — |
| 6 hours | | Nil | Nil | Nil | 0·66 | 0·43 |
| 7 hours | | | | | Tr. | Tr. |
| 24 hours | | | | | Nil | Nil |

* Each column refers to a single animal.
† Units of penicillin/ml.

After administration of 5 mega units of calcium penicillin in 40 ml. of arachis oil with 4·5 per cent. beeswax subcutaneously no demonstrable level of penicillin could be detected in the blood. The inoculum caused a slight local reaction from which a small amount (1 ml.) of fluid was aspirated 48 hours later. Assay of this fluid revealed 4,000 u./ml. of penicillin as against 125,000 u./ml. of the original inoculum. It is possible that in this case absorption was very much delayed. This experiment was repeated with a similar result.

Since the report of Bigger (1946) that penicillin and a sulphonamide when used at the same time have a synergistic effect, it was decided to use L.S.F. (sulphanilamide lactoside formaldehyde sulphoxylate) as a vehicle. Since L.S.F. is hygroscopic it would possibly tend to prevent the rapid diffusion of penicillin from the inoculation site into the body fluids. Sodium penicillin first dissolved in the minimum amount of distilled water, was suspended in 20 ml. of L.S.F. and the penicillin blood levels following subcutaneous inoculation are shown in Table III.

It will be noted by comparing Tables II and III that the blood levels are only prolonged for a relatively short period by vehicles other than water.

INTRAMAMMARY ADMINISTRATION IN LACTATING COWS

Since it has been recommended that 20,000 units is the optimum amount of penicillin to be infused into a quarter of the bovine mammary gland for the treatment of streptococcal mastitis (A.R.C. Report, 1946), it was decided to adopt this amount as a standard dose. This level of the drug was incorporated in various substrates infused into the quarter via the teat canal and the penicillin level of a sample from the bulk milk of each quarter was assessed by the methods described above. Milk samples from the three milkings (*viz.*, 14 hours, 24 hours, 38 hours) subsequent to the administration of the drug were assayed. A hypodermic syringe was used to infuse quantities up to 20 ml. and for the 50 ml. amounts gravity infusion was carried out with a flutter valve apparatus.

1. *Aqueous solutions*

Sodium penicillin was used. No untoward reaction was produced in the gland and milk production was unimpaired. After 14 and 24 hours the penicillin concentration was very similar for the different volumes of inocula. (See Table IV.)

Schofield (1946) stated that after intramammary administration of 100,000 units penicillin the drug could be detected in the blood of the subcutaneous abdominal vein for four hours. We were unable to demonstrate the passage of penicillin from milk to blood using this level of inoculum. In further experiments when 500,000 units of penicillin were infused into the forequarter of the udder we were still unable to detect penicillin in the blood of the "milk vein."

TABLE IV

PENICILLIN MILK LEVELS IN INDIVIDUAL LACTATING COWS AFTER INTRAMAMMARY INFUSION OF 20,000 UNITS OF SODIUM PENICILLIN •

| Volume of vehicle infused into quarter | Vehicle: Distilled water | | Sulphanilamide L.S.F. | | Liquid paraffin with 4·5% beeswax | |
|---|---|---|---|---|---|---|
| | Time after infusion | | Time after infusion | | Time after infusion | |
| | 14 hours | 24 hours | 14 hours | 24 hours | 14 hours | 24 hours |
| 1 ml. | 2·7†‡ | Nil | 1·9 | Tr. | 3·5 | 0·5 |
| | 3·0 | Nil | 1·0 | Tr. | 4·3 | 0·6 |
| | 3·0 | Tr. | 3·2 | 0·56 | 3·2 | 0·36 |
| | 5·0 | Tr. | 3·8 | 0·45 | 2·7 | 0·5 |
| 5 ml. | 3·5 | 0·45 | 4·0 | 0·54 | 2·3 | Nil |
| | 1·9 | 0·2 | 2·2 | 0·45 | 1·4 | Nil |
| | 1·0 | 0·2 | 2·2 | 0·3 | 2·0 | Nil |
| 10 ml. | 4·0 | 0·85 | 2·7 | 0·5 | 1·4 | Nil |
| | 5·7 | 0·5 | 3·0 | 0·72 | 3·3 | 0·36 |
| | 2·4 | 0·25 | 2·6 | 0·5 | 2·7 | 0·25 |
| | 3·0 | 0·3 | | | | |
| 20 ml. | 1·4 | 0·2 | 3·4 | 0·4 | 2·7 | 0·33 |
| | 0·9 | 0·2 | 4·1 | 0·68 | 1·7 | Nil |
| | 2·4 | 0·37 | 1·0 | Nil | 0·6 | Nil |
| | 1·5 | 0·32 | | | | |
| | 2·5 | Nil | | | | |
| | 1·3 | Nil | | | | |
| 50 ml. | 0·63 | No assay | 3·6 | No assay | 0·3 | Nil |
| | 0·8 | „ | 2·8 | „ | 0·3 | Nil |
| | 4·4 | 0·25 | 2·2 | 0·32 | 0·3 | Nil |
| | 1·1 | Nil | 0·725 | Nil | | |
| | 0·7 | Nil | 2·3 | 0·42 | | |

• Assays at 38 hours not shown in tables since all were negative.
† Each figure refers to a single animal.
‡ Units of penicillin/ml.

2. *Arachis oil with beeswax or lanoline*

This experiment was made to investigate whether beeswax or lanoline added to arachis oil as the vehicle for the penicillin infusion prolonged the penicillin level in the milk. The various combinations and their persistence in the milk after infusion are shown in Table V. These materials were highly viscous and had to be heated to 37° C. before being infused into the udder.

After 14 hours the penicillin concentration was similar in all cases but at 24 hours the smaller inocula of arachis oil plus beeswax appeared to show a slightly better penicillin persistence. (See Table V.)

TABLE V

PENICILLIN MILK LEVELS IN INDIVIDUAL LACTATING COWS AFTER INTRAMAMMARY INFUSION OF PENICILLIN •

| Volume of vehicle infused into quarter | Vehicle: Arachis oil + 4·5% lanoline, containing 20,000 units sodium penicillin | | Arachis oil + 4·5% by volume of beeswax, containing 20,000 units calcium penicillin | | Arachis oil + 2·5% by volume of beeswax, containing 20,000 units sodium penicillin | |
|---|---|---|---|---|---|---|
| | Time after infusion | | Time after infusion | | Time after infusion | |
| | 14 hours | 24 hours | 14 hours | 24 hours | 14 hours | 24 hours |
| 1 ml. | 2·1†‡ | 0·25 | 2·8 | 0·5 | 3·4 | 1·1 |
| | 4·2 | 0·5 | 2·0 | 0·35 | 2·4 | 0·5 |
| | 3·3 | 0·42 | 3·0 | 0·7 | 2·5 | 0·46 |
| | 2·5 | 0·34 | 2·4 | 0·33 | 3·2 | 0·42 |
| | | | 2·4 | 0·35 | | |
| | | | 2·0 | Tr. | | |
| 5 ml. | 4·0 | 0·68 | 3·4 | Nil | 1·6 | 0·25 |
| | 1·6 | 0·32 | 3·6 | Nil | 3·4 | 0·65 |
| | 2·5 | 0·43 | 4·0 | 0·68 | 2·3 | 0·4 |
| 10 ml. | 3·0 | 1·0 | 2·9 | 0·48 | 1·75 | 0·21 |
| | 2·7 | 0·35 | 1·9 | 0·25 | 0·85 | Nil |
| | 3·6 | 0·5 | 4·0 | 0·78 | 1·5 | 0·32 |
| | | | | | 1·2 | 0·28 |
| 20 ml. | 3·0 | 0·25 | 2·5 | 0·45 | 1·4 | Nil |
| | 2·4 | 0·3 | 2·6 | 1·4 | 2·3 | Nil |
| | 2·2 | 0·25 | 2·2 | 0·63 | 3·8 | Nil |
| | | | | | 3·2 | |
| 50 ml. | 1·9 | Nil | 1·6 | Nil | 3·0 | Nil |
| | 7·0 | 1·3 | 2·5 | Nil | 2·5 | 0·3 |
| | 3·4 | 0·4 | 2·9 | Nil | 1·1 | Nil |

• Assays at 38 hours not shown in tables since all were negative.
† Each figure refers to a single animal.
‡ Units of penicillin/ml.

3. *Teat bougies*

The penicillin was incorporated into a coco-butter base and made into bougies of a size suitable for administration. The results (Table VI) show that penicillin was detectable in the milk 14 and 24 hours after insertion.

TABLE VI

PENICILLIN MILK LEVELS IN LACTATING COWS AFTER INSTALLATION OF TEAT BOUGIES •

| Size of bougie | Wire supported teat bougie | | Gelatin supported teat bougie | |
|---|---|---|---|---|
| | Time after infusion | | Time after infusion | |
| | 14 hours | 24 hours | 14 hours | 24 hours |
| 65 mm. × 2·5 mm. diameter | 1·48†‡ | No assay | 38 | 0·8 |
| | 2·15 | „ | 1·1 | 0·23 |
| | 2·6 | „ | 1·5 | 0·7 |
| | | | 1·95 | 0·625 |
| | | | 2·2 | 0·37 |
| | | | 2·0 | 0·5 |

• Assays at 38 hours not shown in tables since all were negative.
† Each figure refers to a single animal.
‡ Units of penicillin/ml.

4. *Oculentum base*

The base for the penicillin was the oculentum penicillini B.P., to which 20,000 units of sodium penicillin dissolved in the minimum amount of distilled water was triturated to an even mixture with the melted ointment.

The results of the small number of assays show that the larger bulks have the better persistence at both 14 hours and 24 hours (Table VII). The results appear high and it is possible that some of them may be erroneous due to the unavoidable taking up of an undetected bead of ointment into the sampling pipette.

TABLE VII

PENICILLIN MILK LEVELS IN LACTATING COWS AFTER INTRAMAMMARY INFUSION OF 20,000 UNITS OF PENICILLIN IN THE OCULENTUM BASE

| Amount of infusion | Time after infusion | |
|---|---|---|
| | 14 hours | 24 hours |
| 1 gramme | 6·0 • | 1·6 |
| | 5·2 | 1·2 |
| | 2·1 | 0·4 |
| | 2·8 | 0·32 |
| 5 grammes | 4·6 | 1·1 |
| | 2·7 | 0·8 |
| | 3·3 | 0·74 |
| 10 grammes | 3·25 | 1·3 |
| | 4·7 | 2·0 |
| 20 grammes | 16·0 | 2·5† |

• Units of penicillin/ml.
† Value at 38 hours — 0·6 u/ml.

5. *Other vehicles*

These were liquid paraffin and sulphanilamide lactoside formaldehyde sulphoxylate (L.S.F.). (See Table IV.) The persistence of penicillin at 14 hours and 24 hours was similar for each of these vehicles.

INTRAMAMMARY ADMINISTRATION IN NON-LACTATING COWS

Schofield (1946) recorded that 25,000 units of penicillin in 200 ml. of water infused into non-lactating quarters gave a concentration of 0·44 u./ml. in mammary secretion at 24 hours. An experiment was made to investigate the persistence of penicillin in the udder of dry cows. One ml. of arachis oil with 4·5 per cent. beeswax containing 20,000 units of calcium penicillin was infused into the four quarters of a dry cow. The results are shown in Table VIII.

TABLE VIII

PENICILLIN IN UDDER SECRETION OF NON-LACTATING QUARTERS AFTER INFUSION OF 20,000 UNITS OF CALCIUM SALT IN ARACHIS OIL PLUS 4·5 PER CENT. BEESWAX

| Volume of vehicle | Time after infusion | | | | | |
|---|---|---|---|---|---|---|
| | 14 hours | 24 hours | 38 hours | 48 hours | 62 hours | 72 hours |
| 1 ml. | 230• | 33 | 8 | 1·7 | — | — |
| | 210 | 28 | 17 | 3·5 | 1·3 | 0·85 |
| | 230 | 45 | 16 | 4·0 | 1·1 | 0·54 |
| | 270 | 36 | 8·5 | 3·2 | 0·9 | 0·48 |

• Units of penicillin/ml.

## Discussion

In the cow the absorption and excretion of penicillin administered parenterally follow the pattern already shown for man by Florey *et al.* (1941) and in the domestic animals by Doll and Dimock (1946), for the horse and sheep (Doll and Hull, 1947) and Beyer *et al.* (1945) for the dog. Absorption was rapid with a readily detectable blood concentration within a few minutes after injection. Excretion was also very rapid and even when 5 mega units was introduced was complete in 12 hours. The rather prolonged persistence of calcium penicillin as shown in our experiments is probably due to the use of a low grade penicillin salt.

Incorporation of the penicillin in oil and wax, and L.S.F. does not appear to prolong the maintenance of an adequate blood concentration. It is remarkable that the oleum penicillini B.P., when injected subcutaneously in large amounts, produced no detectable value in the blood, suggesting that absorption was markedly retarded. Romansky and Rittman (1945) reported that a similar preparation maintained a detectable blood level for 24 hours in man.

It would appear, therefore, that the treatment of systemic disease in bovine animals would require the administration of 2 mega units of penicillin every eight hours. The results suggest that the use of aqueous solution would give as good results as would any other vehicle.

The intramammary infusion or the intramammary instillation of 20,000 units of penicillin in various vehicles of a bulk ranging from 1 ml. to 50 ml. all show a detectable amount of penicillin after 14 hours—the maximum time between any two milking periods. Further persistence of the drug after this period varied greatly, and it appeared that the individuality of the cow or the udder tissue plays some part in this connection. The results therefore confirm the findings of Murnane (1945), Weirether *et al.* (1945) and Schalm and Casselberry (1946) that penicillin may persist in the milk 12 hours after infusion into the mammary gland in doses of 20,000 to 25,000 units.

There has been a wide variation in the recommended volume of vehicle as the optimum amount for intramammary infusion. Schalm and Casselberry (1946), Byrne *et al.* (1946) suggested a volume of 50 ml. or 100 ml., Stevenson (1946) recommended a volume of 100 ml. for the treatment of bovine mastitis although Bryan *et al.* (1946) stated that results were similar when inocula of 5, 25, 50 and 100 ml. were used. It has been suggested that these relatively large volumes are necessary to allow total diffusion of the penicillin throughout the gland. On the other hand, udder infusion of large volumes takes much time and labour in the preparation of materials and in their administration.

The results demonstrate that after the infusion into a quarter of the mammary gland of small volumes of different bases containing the recommended dose level of 20,000–25,000 units of penicillin for the treatment of bovine streptococcal mastitis, the drug persists for at least 24 hours. It was shown in the case of oily vehicles, by Romansky and Rittman (1945), that penicillin would retain its potency much better in comparison with aqueous solutions.

We have been able to confirm the observation of Seeley *et al.* (1945) that penicillin administered parenterally does not pass from the blood to the milk in detectable amounts. On the other hand, we have been unable to confirm the finding reported by Schofield (1946) that after intramammary infusion of the two forequarters of the udder of a cow with 100,000 units penicillin could be detected for four hours in the mammary vein. We have been unable to demonstrate the passage of penicillin from the milk to the blood even after the infusion of 500,000 units of penicillin per quarter.

A study of the possible effect on milk production of intramammary infusion of penicillin in the varying amounts of the different vehicles used could not be made as the cows used for this work were normally machine milked and during the period of the investigation were hand milked. As far as could be ascertained, penicillin infusion caused no untoward effects such as diminution in the volume of milk being excreted or changes in the quality of the milk. A wide variation in the percentage recovery of the penicillin infused into the lactating mammary gland was shown; this variation was shown by the quarters of the same gland infused simultaneously with the same preparation.

In the non-lactating cow it was shown that penicillin would persist in the mammary gland for periods up to 72 hours following the introduction of 20,000 units. Schofield (1946) has recorded that 25,000 units penicillin in 200 ml. water infused into non-lactating quarters gave a concentration of 0·44 u./ml. in mammary secretion at 24 hours.

## Summary

1. Penicillin administered parenterally to cattle was rapidly absorbed and rapidly excreted.

2. Incorporation of the penicillin in arachis oil and beeswax, and in sulphanilamide lactoside formaldehyde sulphoxylate (L.S.F.) only slightly delayed the excretion of the drug.

3. Two mega units of penicillin administered at eight-hour intervals is suggested for the treatment of systemic disease in cattle.

4. Penicillin persisted in the lactating udder after intramammary infusion for at least 14 hours, further persistence depending upon the individuality of the cow or the udder tissue. The drug was present in the milk after 24 hours in some cases and in one instance was still detectable after 38 hours.

5. In non-lactating quarters penicillin persisted up to 72 hours after injection of the drug in arachis oil and beeswax.

6. Persistence of penicillin in the udder appeared to be independent of the volume of the inoculum.

7. The drug did not pass into the milk after parenteral injection or into the blood after intramammary infusion.

8. The drug produced no obvious systemic or local effect after parenteral administration or adverse effect on the mammary gland of cows or interference with milk production after intramammary infusion.

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## VETERINARY TRAINING OF AFRICANS

In a note on the graduation of two Africans in July, 1947, at the Veterinary School at Kaduna, Vom, which event was the subject of extended reference in our issue of October 11th, the Empire Information Service observes: "It is in accordance with British Colonial policy that Africans be given opportunities of higher education inclusive of professional training. Under the Colonial Development and Welfare Acts His Majesty's Government is contributing towards the cost, while the Colonial Governments and United Kingdom universities are organizing the facilities. A limited number of Colonial students are receiving training in Britain, but it is hoped that in the near future much of this training may be possible in their own countries. In veterinary circles in Nigeria, a beginning has been made with the building in 1943 of the Vom Training School which was completed in 1946. The total cost, met by grants under the Colonial Development and Welfare Acts, was £51,000. Vom is situated in the heart of the cattle country on the Jos plateau where there is access to ample clinical material of all kinds for students. Kaduna Vom is also the headquarters of the Nigerian Veterinary Department, and the site of a large and well-equipped veterinary research institute. The breeding of pigs for marketing and the preparation of dairy products are in full development, and they are an excellent background for veterinary education. The school provides a complete course leading to the award of a Licence of Veterinary Medicine and Surgery for students who have already passed the London Intermediate Science, London First M.B. or other exempting examination."

## CLINICAL COMMUNICATION

# Penicillin in Leptospira canicola Infection in the Dog

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The following brief account of a limited number of cases of leptospirosis in the dog is merely intended to serve as a preliminary report of the use of penicillin in this condition.

It should be made clear that this communication does not purport to describe in detail the syndrome produced by *Leptospira canicola*, but solely to discuss the use of penicillin in primary uncomplicated cases.

Investigation is being made into the possible long-term effects of *Leptospira canicola* infection and it is hoped to publish some further notes at a later date.

In our hands penicillin has proved virtually specific in primary uncomplicated *Leptospira canicola* infection; in fact, so dramatic has been the response in the majority of cases that the use of the drug as a means of differential diagnosis is considered justifiable.

Positive diagnosis has been arrived at by use of the agglutination test, Dr. Broom of the Wellcome Laboratories of Tropical Medicine having carried out cross-agglutination tests against *Leptospira canicola* and *Leptospira icterohaemorrhagica* on our behalf. Where possible it is desirable to take blood early in the disease when agglutinins should be absent, or present only in low titre, and to re-test some two to six weeks after the onset of the disease when the titre should show a marked rise. This is not always possible in practice and a late serum giving a positive titre following a history of clinical leptospirosis is regarded as conclusive.

It will be noted that on two occasions clinical recovery occurred within 48 hours of the initiation of penicillin treatment, but that relapse followed the cessation of penicillin after a four-day course. An eight-day course was sufficient in each case to obtain permanent recovery.

CASE 1. (J. O. J.)

*Subject.*—Scottish terrier bitch; aged two and a half years.

14.10.46. Presented with history of excessive thirst and polyuria of some two weeks' duration. General health and appetite good. No vomiting. In period of pseudo-pregnancy.

T. 103·2° F. (subsequently proved to be an excitement rise as it was always elevated at the surgery but normal or sub-normal at home). Tonsils slightly enlarged. No uraemia. Pulse normal.

Sulphapyridine prescribed.

17.10.46. Urine sample received, insufficient for specific gravity; negative for albumen.

Subsequent urine samples: S.G. 1005; albumen negative. Reports re health revealed little change, thirst persisting but otherwise normal; intermittent loss and gain of weight.

7.11.46. Slight loss of appetite, thirst still excessive, slight dullness. Temperature at home sub-normal (99 to 100° F.). Bitch now poor in condition, tip of tongue dirty, brick-red colour, buccal mucosa dry. No uraemic odour or ulceration of mucosa. Left kidney now palpable, clear of costal arch, enlarged and painful on pressure. The case was now considered to be a nephritis in spite of the absence of albuminuria and treatment was prescribed accordingly.

12.11.46. General deterioration; complete inappetence, vomiting. Tongue now brick colour all over. Kidney very enlarged and painful. Uraemic odour. Leptospirosis suspected. 33,000 units penicillin given subcutaneously, repeated by owner at five-hourly intervals.

14.11.46. Some improvement already evident; kidney decreased in size by approximately one-third.

Improvement was so rapid from this point that penicillin was discontinued after four days; total penicillin administered, 400,000 units.

19.11.46. Although the bitch was bright and eating fairly well, the tongue colour had deteriorated and the palpable kidney was enlarging and more painful. Penicillin therapy was re-commenced.

20.11.46. Tip of tongue black and dry; necrosis commencing; kidney again smaller. Penicillin at the rate of approximately 100,000 units daily was continued for eight days.

29.11.46. Bitch eating and bright; putting on weight; tongue almost normal in colour; uraemic odour no longer detected. Kidney still enlarged but not painful. Hexamine/sodii acid phosphate therapy.

7.12.46. Urine sample: S.G. 1024 (the first increase in concentration noted); albumen negative.

16.12.46. Excessive thirst and polyuria persisting, otherwise normal. Condition good. Tongue colour not yet satisfactory. Blood sample taken: positive at 1 in 3,000 against *Leptospira canicola*.

Brewers' yeast was given throughout to ensure adequate vitamin B complex intake; this was continued until 17.1.47 by which time the tongue colour had gradually returned to normal and condition good.

At the time of writing (September 1st, 1947) the bitch is in good condition and is now in whelp. Thirst is still somewhat increased and the polyuria only very slowly diminishing. It is considered that there is permanent kidney damage in this case.

CASE 2. (J. O. J.)

*Subject.*—Cocker spaniel, male; aged nine months.

12.12.46. Off colour one day, shivering; vomited once. Diarrhoea.

T. 102·2° F. Conjunctivae dirty. Pulse bounding and full. Was regarded as a probable early canine distemper case and 20 c.c. anti-distemper serum given.

16.12.46. Temporary improvement, followed by relapse. Inappetence, vomiting. T. 101° F. Pharynx congested. Losing weight. Pulse rapid and weak. Abdominal palpation negative. Urine sample requested.

17.12.46. Urine sample: S.G. 1015; neutral; albumen ++. The case was now considered to be an infective nephritis, probably not leptospiral, but penicillin was considered preferable to the sulpha drugs in view of renal involvement. 125,000 units oily penicillin intramuscularly. This dosage was continued for four days, improvement having been almost dramatic after the first dose with apparent recovery in 48 hours.

20.12.46. Urine sample: S.G. 1018; albumen +.

23.12.46. Relapse occurred; loss of weight and inappetence.

Penicillin therapy was re-instituted as before, the owners now giving the injection. Dosage at 125,000 units daily was continued for eight days, during which clinical recovery occurred and was maintained.

30.12.46. Dog in normal health, still rather thin but no longer hide-bound.

Urine: S.G. 1018; albumen +.

17.1.47. Normal health and condition. Urine negative for albumen. Blood sample: positive against *Leptospira canicola* at 1 in 30.

The comparatively low titre in this case was probably due to the early initiation of penicillin therapy, thus cutting short antibody formation by destruction of the organisms.

CASE 3. (J. O. J.)

*Subject.*—Scottish terrier, male; aged five to six years.

The history in this case is probably inaccurate and incomplete owing to the owner being an invalid and unable to give any detailed observations of the dog's condition; for example, the history was said to be of only 48 hours' duration before advice was sought but, on careful enquiry later, it was found that the history should have covered at least two weeks and probably four weeks before symptoms were remarked by the owner. It is felt, therefore, that this must be classed as a late case, particularly in view of the result of the agglutination test.

27.12.46. Dog said to have been ill 48 hours. Dull; off food; passing small quantities of dark, tarry faeces frequently.

T. 102·4° F. Pulse rapid and thready. Abdominal palpation merely revealed diffuse tenderness and pain which could not be localized and was considered at this stage to be probably an enteritis of dietetic origin. Phthalyl-sulphathiazole was prescribed.

30.12.46. No improvement. No thirst or vomiting noted. The dog was now in very poor condition, tucked up and showing evidence of considerable pain on abdominal pressure; the expression was anxious, indicating the possibility of a peritonitis.

Leptospirosis was suspected and a blood sample taken in the belief, at this stage, that it would be an "early" sample. When a titre of 1:3,000 against *Leptospira canicola* was returned a more detailed examination of history was made and the facts previously mentioned elicited. In spite of the fact that it was obvious that the infection was both old-standing and more generalized than in the previous cases, it was decided to try penicillin and 250,000 units oily penicillin were given intramuscularly.

Penicillin therapy (125,000 units daily) was continued for nine days; there being a quite marked improvement in the dog's general health and spirits, in spite of progressive changes in liver, kidneys and pleurae.

Jaundice developed in the third day of penicillin treatment and two days later the liver could be palpated behind the costal arch and this enlargement progressed until death occurred.

On the sixth day there was evidence of pleuritis and pericarditis, and the icterus was now fading.

The dog continued to eat a little and was remarkably bright considering the tissue damage which had occurred. His condition gradually deteriorated, however, and death occurred on the ninth day after the commencement of penicillin therapy.

*Post-mortem* examination revealed inflammatory changes in kidneys, liver, pleurae and pericardium; all of which had been detectable in life. There was also evidence of recent acute pneumonia which was the actual cause of death.

Case 4. (M. J. F.)

*Subject.*—Bull terrier, male; aged two years.

27.11.46. An urgent call was made by the owner with a history that the dog had seemed slightly dull during the past 24 hours and, during the last six hours, its condition had rapidly deteriorated. It had vomited three times during the day, was intensely dull, completely off food, shivering and seemed unable to stand.

Examination showed an inability to remain standing, apparently due to muscular weakness.

T. 101° F. Pulse rapid and thready; mucous membranes dirty and pallid. Tongue dry with brownish stain on dorsum; slight uraemic breath odour. Some pain elicited on pressure over kidney area.

The case was considered to be one of sub-acute nephritis, probably *Leptospira canicola*, and penicillin treatment was commenced at once. Dosage: 1 c.c. (125,000 units) oily suspension ca. salt intramuscularly every 24 hours.

General treatment: glucose and water by mouth three-hourly; elixir chelidon *t.d.s.*

29.11.46. Considerable improvement was noted. The dog was much brighter and able to walk without staggering. No further vomiting had occurred. Appetite had returned. T. 100·5° F. Pulse firmer, but still rapid. Mucous membranes and tongue improved in colour.

Urine: S.G. 1010; albumen +; sugar −; bile −.

30.11.46. Feeding normally, very bright.

Penicillin treatment was continued for eight days in spite of apparent normality.

12.12.46. Serum sample *Leptospira canicola* positive at 1/300. Dog apparently normal. Urine: S.G. 1020; albumen −.

No relapse has occurred up to the time of writing and it is thought that there is no residual kidney damage.

Case 5. (M. J. F.)

*Subject.*—Mongrel sheepdog, male (approximately 50 lb. weight); aged two years.

3.2.47. History of dullness and inappetence over the past three days; vomiting on the first day, but not since.

Examination: T. 105° F.; tonsils enlarged and bright red; mucous membranes dirty; tongue brick-red; some pain on palpation of kidney area and border of liver; pulse rapid, but firm.

In view of the enlarged tonsils and high temperature the case was at this stage thought to be streptococcal with possibly kidney involvement, and treatment was commenced with sulphamezathine eight-hourly.

Urine was requested.

4.2.47. Urine: S.G. 1030; albumen +; bile +; sugar −.

There was considerable improvement in general condition. T. 101° F. Appetite returning.

Sulphamezathine was continued a further 48 hours.

In view of the urine result it was decided to check the possibility of *Leptospira canicola* infection by serum agglutination as well.

14.2.47. Serum agglutination returned: *Leptospira canicola* + 1/1,000; *Leptospira icterohaemorrhagica* ± 1/10 and ± 1/30.

Further enquiry into case history elicited the information that the dog had had an attack of vomiting and inappetence lasting three days, a fortnight prior to the last one, and had apparently recovered, thus accounting for the case being sufficiently advanced to show a high titre when tested.

When seen 15.2.47 the owner gave the further history that since last seen the dog had had no recurrence of high temperature, but continued to be dull, and appetite very variable.

Examination showed pain still present on palpation of kidney and liver border areas; mucous membranes dirty; tongue still dry; T. 100° F.

Urine: albumen +; S.G. 1030; bile +.

The case was now considered to be primarily one of *Leptospira canicola* infection, the high temperature (on 13.2.47) and inflamed tonsils being secondary or coincidental streptococcal infection.

Accordingly, an eight days' course of penicillin, 1½ c.c. oily suspension ca. salt 24-hourly intramuscularly, was commenced.

After 48 hours real improvement in spirits and appetite were reported and no pain was found on palpation.

24.2.47. Urine: S.G. 1030; albumen −; bile −.

This case is now considered a complete recovery. No relapse has occurred to the time of writing.

Case 6. (M. J. F.)

*Subject.*—Mongrel, male (approximately 20 lb. weight); aged five years.

30.1.47. Urgent call received. Dog normal last night, unable to stand in the morning; vomited three times during the past three hours; very strongly resented handling.

The owner suspected accident since the dog had been out alone in the early morning, but as the animal was normally bad-tempered he had been unable to examine him for sign of injury.

Examination: No external injury visible; acute pain on pressure of an area in the right flank over the last few ribs. Pain rather difficult to localize owing to resentment at any handling. Visible mucous membranes dirty and very pallid; tongue dry and brown-stained

T. 99·8° F.; pulse irregular, thready and rapid; breath noticeably uraemic.

Urine was requested but not obtained.

In view of the other findings it was considered that accident, if any, was purely coincidental and that the main cause of collapse was probably *Leptospira canicola*. Localized pain was probably due to injury.

Treatment: Coramine liquid 5 m. three-hourly by mouth. Penicillin intramuscularly 125,000 units (1 c.c.) ca. salt suspension in oil 24-hourly to be continued for eight days.

3.2.47. Considerable improvement in condition and appetite. T. 100° F.; breath normal; mucous membranes and tongue normal; pulse stronger but still irregular.

The dog was able to walk stiffly, but still showed pain in the right flank.

Urine: S.G. 1020; albumen ±; bile +.

7.2.47. A fluctuating swelling had appeared in the right flank. T. 103° F.; less pain; otherwise much improved.

This swelling was diagnosed as an abscess, probably due to injury unconnected with the rest of the illness. Hot fomentations were prescribed; natural bursting took place within 24 hours. No further drainage was required and recovery from that point was uneventful.

12.2.47. Serum sample returned: *Leptospira canicola* + 1/300, ± 1/1,000; *Leptospira icterohaemorrhagica* + 1/10, ± 1/30.

Urine: S.G. 1025; albumen −; bile −.

No relapse has occurred.

## Conclusion

1. Penicillin appears to be almost a specific in the treatment of *Leptospira canicola* infection in the dog.

2. The successful outcome of treatment depends upon the degree of tissue damage at the time of initiation of penicillin therapy; also upon the number of organs involved. This is exemplified in the case No. 1 in that a case of six weeks' duration in which kidneys only were involved responded satisfactorily to treatment, whereas Case No. 3—which was presented with a positive history of only four days—failed to recover due to the extensive tissue damage in many organs.

3. Dosage should be continued for at least seven days, even if clinical recovery appears complete earlier.

4. The response to penicillin is so spectacular that the use of this drug as a diagnostic aid in suspected cases is probably justified.

It seems reasonable to assume that, if a case shows no response to adequate dosage of penicillin within 48 hours, it is not a case of primary *Leptospira canicola* infection. Even cases in which considerable tissue damage has occurred show a marked systemic response to penicillin, even if recovery cannot take place.

*Acknowledgment.*—Our thanks are due to Dr. J. C. Broom for carrying out the agglutination tests.

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Two flasks prepared in this way and used at the sub-centre during the past month, compared very favourably with two of the former type also in use, and were much preferred by the lay inseminators.

This improved flask is not yet the ideal, but if this article should stimulate some other colleague to go into this important part of A.I. work and create something better, then I should feel amply repaid for my efforts.

## NEW INSTRUMENTS AND APPLIANCES

### Improved Flask for the Transport of Bovine Semen

R. G. HALCROW, M.R.C.V.S.
Petersfield, Hants

While working recently at an artificial insemination sub-centre, I noticed that the conception rates were generally rather lower than those of the main centre. As the lay inseminators were very capable men, and the disease incidence among the cattle of the area was no greater than that of the adjoining district served by the main centre, I turned my attention to the transport of semen.

The method used (Diagram 1) in making up vacuum flasks is self-explanatory and consists of packing the test tubes of semen loose in a flask with crushed ice, the ice being separated from the test tubes by a thick layer of cotton wool and cellulose wadding.

Inspection of these flasks at the end of the day's work revealed the fact that the ice had melted to a certain extent, soaked the packing material, and quite often formed a layer of ice water in the bottom of the flask, with a temperature of 0 to 1° C. Temperature readings taken over 24 hours with a centigrade thermometer in a test tube of discarded semen in this type of flask, showed that the temperature in the tubes dropped as the ice melted and finally settled at 0 to 1° C.

To overcome this I did some experiments, using two centigrade thermometers, some small tins complete with lids, and some scraps of blanket and felt material and evolved the flask (Diagram 2).

In this the ice is placed in the tin and lid replaced and the material, sewn to form a cover for it, with another layer stitched on (cartridge-paper fashion) to form pockets for the test tubes, and the whole placed in the flask on a pad of cotton wool to protect the bottom. Comparative temperature readings from flasks fitted up as in Diagrams 1 and 2 were taken; both flasks were kept side by side at room temperature, and the readings from flask 2 showed that the temperature settled at 4 to 5° C., and remained steady even until the ice had all melted. This flask has also the advantage of being simple to make and easy to prepare and handle. The test tubes are better protected, and the temperature in all the tubes remains constant and can be varied only by using material with a greater or less insulating power.

As the tests were carried out during the summer months, further trials would be necessary during the winter when the outside temperature is lower, to gain further information on this type of flask.

Another idea which may be of value is the incorporation of a bone inset on the top of the rubber stopper, with perhaps a coloured border to denote type of bull, on which the initials of the bull, date of collection and dilution of semen could be written, to obviate mistakes due to loss of stick-on labels on the test tubes.

(*Concluded at foot of col. 2, previous page*)

DIAGRAM 1

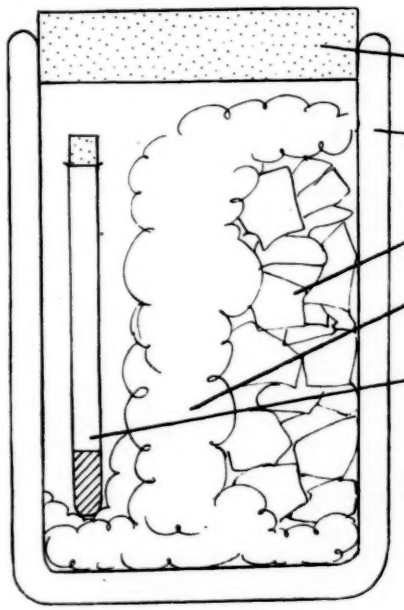


DIAGRAM 2

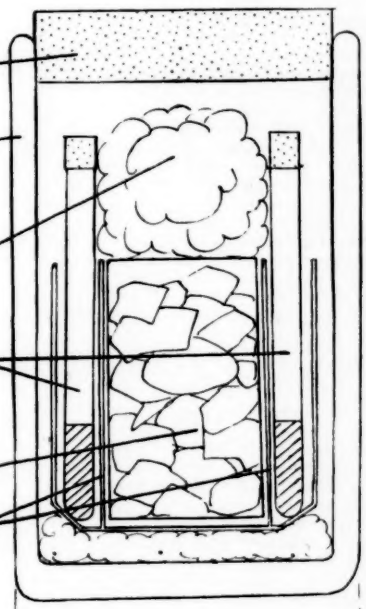



DIAGRAM 3

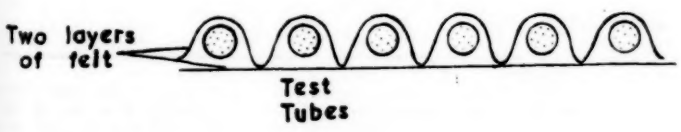
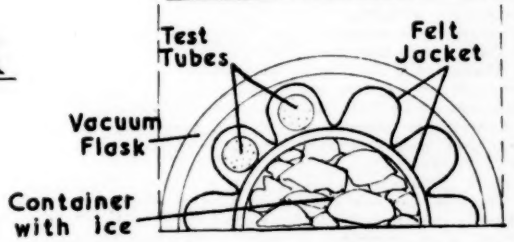



DIAGRAM 2A
Section of flask from above



# ABSTRACTS

**[The Importance of Cowshed Hygiene in the Transmission of Milk-borne Disease.** Watts, P. S. (1947.) *J. Roy. San. Inst.* **47.** 458-465. (4 tables, 6 refs.).]

Watts points out that milk-borne diseases may be divided into two major groups, those which are controllable by administrative measures, *e.g.*, tuberculosis and abortion, and those which are controllable by hygienic measures. It is to the latter group that this paper is devoted and the diseases concerned include:—

(1) Those of human origin in which infection reaches the milk either from an infected attendant (*e.g.*, typhoid) or indirectly from the cow becoming infected or the utensils contaminated;

(2) Those originating from the cow, *e.g.*, *Salmonella enteritidis* var. *dublin* or indirectly from the attendant.

Hygienic precautions are of minor importance in the control of tuberculosis and abortion, and the causal agents of the common forms of mastitis are not responsible for disease in man. The only form of bovine mastitis of public health interest is that caused by a streptococcus of human origin. *S. enteritidis* var. *dublin* infection results from the contamination of milk with the faeces of the diseased animal.

Thus, for the most part, the role of hygiene in the cowshed is directed to the prevention of contamination of milk or infection of the cow by human pathogens from attendants. Two common faults leading to this are: (1) excessive handling of the milk, and (2) inefficient washing of the cattle.

Watts states that excessive handling is probably the main factor in spreading many diseases and he considers that there are overwhelming reasons for prohibiting hand-milking in herds producing milk for raw consumption. The milking parlour put at one end of the byre is much to be preferred to machine-milking with the bucket type of machine and if the apparatus were not so expensive he would make its use compulsory for graded milk production.

Inefficient washing is the second great fault in cowsheds. Many farmers, through the use of weak disinfectant, or the use of only one or two washing cloths, through washing too many animals with the same disinfectant, or washing too much of an animal, not only fail to wash their cows efficiently but in the process spread disease. In machine-milked herds with enclosed units, only the teats should be washed *before* milking. If necessary the udder and flanks can be washed after milking. During the washing process two buckets of correctly diluted disinfectant should be used and a separate cloth provided for each animal. All unused cloths should be kept in one bucket and removed singly as required for each animal. After use they should be placed in the second bucket. Watts has confirmed the efficiency of this method experimentally and the paper includes tables in which his results are given. He states that these hygienic measures in conjunction with administrative measures for the control of tuberculosis and abortion should virtually eliminate the risk of milk-borne disease originating in the cow and cowshed.

G. D.

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**[Some Conditions Affecting the Liver in Food Animals.** Allen, C. G. (1947.) *J. Roy. San. Inst.* **47.** 465-473.]

In this paper, Allen first of all emphasizes the food value of liver in the human dietary and then points out that owing to its special function and position in the body it is commonly the seat of disease. Sometimes the lesions, *e.g.*, cloudy swelling and fatty changes, are not in themselves of great significance, but when present they should lead to a careful examination of the rest of the carcase in order to determine the cause. Particularly is this so in cases of emergency slaughter. Other conditions which are mentioned include cirrhosis of the liver, suppurative hepatitis, angiomatosis in cattle, and melanosis in the livers of cattle, sheep and less frequently in pigs.

Of the specific infectious diseases, tuberculosis is dealt with briefly and reference is made to the importance of distinguishing between congenital and post-natal infection in calves. In cattle, actinobacillosis bears some resemblance to hepatic tuberculosis, a condition with which it may easily be confused since the lymph glands may be involved in both conditions. Bacterial necrosis is most common in the bovine liver and is probably due to infection conveyed by the portal vein from the intestine. In this condition, however, the carcase is otherwise perfectly healthy.

Of the parasitic diseases, distomatosis or fascioliasis is the most important as it is estimated that, in this country, the annual loss in livers alone, in terms of retail price, is about £200,000. Allen states that at Birmingham abattoir, the livers of 16 per cent. of cattle are partially or wholly condemned because of this condition. In the discussion which followed, Hughes pointed out that in South Wales the position was even more serious and that liver condemnation from fluke exceeded 50 per cent. in cattle and nearly 20 per cent. in sheep.

Echinococcus cysts are still frequently found in the livers of cattle, sheep and pigs, causing much preventable loss. Such livers should be destroyed and much stricter attention should be given to preventing the access of dogs to diseased offal and to preventing the sale of condemned meat and offal as food for dogs and cats. Some surprise was expressed in the discussion that such meat was being sold.

*Cysticercus tenuicollis* is commonly seen in the livers of sheep and pigs and less commonly in the ox, but *Cysticercus bovis* and *cellulosae* are rarely seen. *Ascaris* infestation of the bile ducts in pigs and the presence of *Pentastomum taenioides* (*Linguatula serrata*) larvae in the liver are occasionally seen. In the rabbit, coccidiosis gives rise to very characteristic yellowish-white cyst-like lesions.

Imported frozen livers not infrequently show deposits of tyrosin crystals on the surface and in the substance of the organ. Such livers, whilst they may not be harmful, are definitely unsaleable.

The discussion was opened by J. H. M. Hughes and he laid stress on the importance of *ante-mortem* inspection of food animals and that the control and direction of meat inspection must be vested in a veterinarian with experience in public health matters. It should be insisted also that all casualty animals should be examined on arrival at the abattoir by a veterinary surgeon. He also maintained that no casualty which had been bled on a farm should be dressed in an abattoir without a blood sample being first examined by a veterinary inspector.

Professor Burrow emphasized the scope which existed for the use of the microscope in meat inspection and also dwelt on the danger of tuberculous meat in the housewife's larder. Even though cooking might render tuberculous meat safe to the consumer one could not overlook the danger of foods which were eaten raw being contaminated in the larder.

McCleery stressed many of the points mentioned by the previous speakers and said, in addition, that he was not at all certain that the tubercle bacillus was killed by cooking in the larger and more compact joints.

Many other speakers took part in the discussion which ranged chiefly around the points already mentioned.

In his reply, Allen mentioned that on instructions from the Ministry of Food, condemned meat from Birmingham abattoir was regularly used for feeding dogs in the Services.

G. D.

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**[Insecticide Potency and Toxicity of Sulphide Derivatives of Benzenehexachloride.** (Trans. title.) Guilhon, J. (1947.) *Rec. méd. Vét.* **123.** 145.]

This article is in two sections; in one, the effect on dog fleas and bees of various sulphides derived from benzenehexachloride is tested, and in the other the toxicity of a monosulphide derivative of benzenehexachloride to various experimental animals is determined.

The insecticides employed are four monosulphides and one disulphide derivative of B.H.C., DDT and the $\alpha$, $\beta$ and $\gamma$ isomers of B.H.C.

The results are recorded in tabular form; such points as inability to fly, paralysis of the legs, are recorded in the case where the insecticides are used on bees.

The toxicity of one of the monosulphides (distinguished by its colour and smell) of benzenehexachloride to experimental animals, which include the sheep, is recorded. This monosulphide is used, as it is commonly employed in insecticides used for the destruction of plant pests.

The toxic effects of the insecticide on a sheep are recorded in detail, although the author points out that this result is based on only one animal. The typical symptoms found were inco-ordination, difficulty in breathing and collapse and death in four and a half days. *Post-mortem* examination showed emaciation of the musculature, congestion and oedema of the lungs, and a light discoloration of the parenchyma of the liver. The dose required to kill a sheep was 160 grammes in an animal weighing 32 kg. In view of the substantial dose required to kill a sheep the author concludes that poisoning of animals from vegetable matter treated with the sulphide derivatives of benzenehexachloride is most unlikely. Bees, however, he finds to be very susceptible to poisoning, and considers that this factor will have to be remembered in the use of the insecticides.

G. C. B.

## Victoria Veterinary Benevolent Fund

### MEETING OF COUNCIL

A meeting of the Council of the Victoria Veterinary Benevolent Fund was held at 10, Red Lion Square, London, W.C.1, on Wednesday, September 24th, 1947, with Mr. Arnold Spicer (President) in the chair.

The following also were present: Mr. Esmond Brown, Professors T. G. Browne, J. B. Buxton (Hon. Treasurer), Major J. J. Dunlop, Mrs. D. I. Glover (representing the Ladies' Guild), Mrs. E. M. Gould, Professor J. McCunn, Capt. W. R. McKinna, Capt. J. W. Procter, Lt.-Col. P. J. Simpson (Hon. Secretary) and Professor G. H. Wooldridge. Mr. C. W. Francis, accountant, was in attendance. Apologies for absence were received from Mrs. W. C. Miller (President of the Ladies' Guild) and Lt.-Col. G. B. Rees Mogg.

*Minutes.*—The minutes of the previous meeting held on May 7th, 1947, having been published, were taken as read and signed as correct.

*Correspondence.*—(*a*) A letter from the Secretary of the Irish Veterinary Medical Association was read, together with the reply of the Hon. Secretary to the Fund. This stated that the figures for the year 1946 showed that: eleven Irish cases were receiving grants, that the amount received in subscriptions from Ireland was £64 6s. 10d., and that the amount paid out by the Fund in grants was £549 5s. 0d.

(*b*) A letter from Mr. W. Hogarth Scott, M.R.C.V.S., of Dandenong, Australia, was read in which Mr. Scott asked if anyone would act as his purchasing agent for drugs, instruments, etc., in England. Mr. Scott would allow 10 per cent. on all purchases, this percentage to be placed to the credit of the Victoria Veterinary Benevolent Fund.

The President (Mr. Arnold Spicer) kindly offered his services in this respect, and the Secretary was instructed to notify Mr. Scott accordingly.

#### Cases

No. 223; late M.R.C.V.S. The Hon. Secretary reported the death of this recipient and read letters from his widow. It was agreed that the grant be stopped for the time being and that the Hon. Secretary be instructed as to the action to be taken in regard to the contents of the communications which had been received.

No. 261; widow, aged 62; two daughters aged 19 and 18. Particulars of this case were reported to the meeting and also the action taken by the Executive Committee.

The action of the Executive Committee in making a grant of £1 per week as from June, 1947, was approved.

No. 159; M.R.C.V.S. Recent correspondence from this member was submitted, together with a report from the Hon. Secretary. It was agreed that the grant in this case be not renewed.

No. 262; widow. The Hon. Secretary reported that an application form had been sent in this case but had not yet been returned. The consideration of this case was therefore deferred pending the receipt of further information from her solicitors.

#### Accountant's Report

The accountant submitted the following report:—

Since the previous meeting of Council, the following subscriptions (including subscriptions under Deed of Covenant) and donations have been received.

*Special Subscriptions*

| | | | |
|---|---|---|---|
| N.V.M.A. (half of underwriting profits *re* insurance policies) ... ... ... ... ... ... | £133 | 4 | 1 |
| V.V.B.F. Ladies' Guild ... ... ... ... ... | 320 | 0 | 0 |
| V.V.B.F. Ladies' Guild (for Christmas Fund) ... | 226 | 0 | 0 |
| | £679 | 4 | 1 |

*Annual Subscriptions by Deed of Covenant*

| | | | |
|---|---|---|---|
| One new subscriber for ... ... | £5 | 5 | 0 |
| One new subscriber for ... ... | 2 | 2 | 0 |
| One existing subscriber for ... | 1 | 1 | 0 |

*Donations*

Collecting boxes—

| | | | |
|---|---|---|---|
| Central Veterinary Society ... ... | £1 | 18 | 1 |
| Eastern Counties Veterinary Society ... | 3 | 0 | 0 |
| Derbyshire Veterinary Association ... | 5 | 12 | 6 |
| Miss M. J. Farman ... ... ... | 3 | 14 | 4 |
| Lincolnshire and District ... ... | 5 | 0 | 0 |
| Scottish Metropolitan Division ... | 1 | 2 | 9 |
| | £20 | 7 | 8 |

| | | | |
|---|---|---|---|
| Anonymous ... ... ... ... ... ... | £5 | 5 | 0 |
| Association of Veterinary Inspectors ... ... ... | 5 | 5 | 0 |
| Cleobury Mortimer and Ludlow Hunt Horse Show (per Capt. T. B. Yarrow) ... ... ... ... ... | 2 | 2 | 0 |
| S. C. Cope (per A. Whicher) ... ... ... ... | 1 | 1 | 0 |
| Major J. J. Dunlop ... ... ... ... ... | 4 | 4 | 0 |
| G. Dunne ... ... ... ... ... ... ... | 1 | 1 | 0 |
| Professor G. A. Duncan (per Professor A. F. O'Dea) ... | 3 | 3 | 0 |
| Eastern Counties Veterinary Society (Shipley Cup Collection) ... ... ... ... ... ... ... | 10 | 11 | 6 |
| Ladies of the North of England Veterinary Medical Association ... ... ... ... ... ... | 6 | 0 | 0 |
| J. H. L. Lyons ... ... ... ... ... ... | 0 | 2 | 0 |
| National Greyhound Racing Club ... ... ... | 5 | 0 | 0 |
| Major G. K. Shaw (Life Membership fee) ... ... | 10 | 10 | 0 |
| Society of Veterinary Practitioners ... ... ... | 10 | 10 | 0 |
| Society of Women Veterinary Surgeons (in memory of Miss M. D. R. Morse) ... ... ... ... ... | 1 | 1 | 0 |
| Weedon and County Horse Show (per Major J. J. Dunlop) ... ... —... ... ... ... ... ... | 2 | 2 | 0 |
| Wellingborough and District Canine Society (per Major J. J. Dunlop) ... ... ... ... ... ... | 1 | 1 | 0 |
| Miss A. M. Wilson ... ... ... ... ... | 0 | 2 | 6 |
| Yorkshire Veterinary Medical Society ... ... ... | 3 | 3 | 0 |
| | £92 | 11 | 8 |

The Report was received and it was also resolved that the thanks of the Council be conveyed to the respective donors.

*Life Membership.*—On the motion of the President, Major G. K. Shaw, M.R.C.V.S., was unanimously elected a Life Member of the Fund.

#### Investments

The Hon. Treasurer reported:—

(*a*) *Redemption of* 3 *per cent. Local Loans.*—That the sum of £7,689 10s. 4d. received in respect of the redemption of 3 per cent. Local Loans had now been re-invested in the purchase of:

| | |
|---|---|
| £1,750 0 0 2½ per cent. Defence Bonds at a cost of | £1,750 0 0 |
| £6,539 19 0 2½ per cent. Consols at a cost of | £5,939 10 4 |

(*b*) *Dr. Bullock's Memorial Fund.*—As no further amounts had been received since the publication of the Annual Report, which reminded members of the existence of this fund, the sum of £170 18s. 0d. standing in the Donations account had been invested in the purchase of £203 7s. 1d. 2½ per cent. Consols. This investment would be shown in the accounts as "Dr. Bullock's Memorial Fund," to perpetuate his memory.

(*c*) £150 3 *per cent. Defence Bonds Redeemable on March 5th,* 1948.—An offer of conversion to 2½ per cent. Defence Bonds (Conversion issue) has been received from the Post Office Savings Department in regard to the above security, and in view of the closing date being fixed for September 15th, 1947, he had authorized the acceptance of such offer.

The action taken by the Hon. Treasurer was approved.

### FOOD POISONING IN NORTHAMPTONSHIRE

"At the end of last month," states *The Lancet* in its issue of October 25th, "there was an outbreak of illness, with diarrhoea and vomiting, at the village of Little Houghton, Northamptonshire. Of a total population of 416, 133 were affected, most of these falling ill on Saturday, September 27th, or Sunday, September 28th; there was one death. Specimens of faeces from three patients on Monday, September 29th, contained salmonella organisms, which were later identified as *S. dublin*.

"Milk was supplied from a single farm to all but 25 of the village's residents; and none of these 25 fell ill. Enquiry at the farm revealed that on the previous Thursday, September 25th, a 2½-year-old heifer had been suspected of having a 'chill'; the heifer had calved prematurely a fortnight before. Milk from this heifer was not included in the bulk supply after Friday, September 26th, but the animal was not isolated from the herd. It died on Saturday, September 27th, and the carcase was removed to a knacker's premises, where it was apparently cut up, boiled, and sold at once, for no trace of it could be found at 4.30 p.m. on Monday, September 29th. Workers at these premises reported, however, that the udder was badly bloodstained.

Samples of the milk delivered on Sunday, September 28th, and Monday, September 29th, contained no pathogenic organisms. On Tuesday, September 30th, a veterinary surgeon from the animal health division of the Ministry of Agriculture found on inspection that one cow in the herd had acute mastitis, while a further two were suspected of having this condition; but samples of milk and faeces from each cow in the herd did not reveal any salmonella organisms. The cow with acute mastitis was removed from the herd, and pasteurization of all milk was instituted."

## QUESTIONS IN PARLIAMENT

### Jury Service

Mr. Hector Hughes asked the Secretary of State for the Home Department what is the reason for the reduction in the age for exemption from jury service from 65 to 60 years of age for both men and women; and if he will reconsider it, in view of the shortage of manpower.

Mr. Younger: The raising of the age for jury service from 60 to 65 was one of the temporary provisions included in the Administration of Justice (Emergency Provisions) Act, 1939, which was brought to an end by an Order in Council of March 10th, 1947. The primary reason for terminating this Act was to permit the restoration of juries in civil actions and there was no power to terminate parts of the Act and retain other parts, but provision was made in the Order in Council by which the age for jury service should not revert to 60 until January 1st, 1948. To continue the emergency provision beyond that date new legislation would be required, and as my right hon. Friend has previously stated, he can hold out no hope of early legislation on the subject of jury service.

Mr. E. Fletcher asked the Secretary of State to the Home Department whether he is aware that the liability to jury service operates unevenly among different sections of the community; and whether he is prepared to introduce legislation to compensate those who serve on juries for loss of time.

Mr. Younger: As my right Hon. Friend has said in reply to previous Questions, he regrets that he cannot hold out any hope that time can be found for legislation on this subject in the near future.

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### Ewes (Sale for Slaughter)

Mr. Vane asked the Minister of Agriculture whether he is satisfied that no ewes or ewe lambs capable of breeding up depleted hill flocks are now passing through the markets for slaughter.

Mr. T. Williams: While I received many reports in September of cases of the sale for slaughter of ewes suitable for breeding, the latest information before me shows that the proportion of ewes to total sheep being purchased by the Ministry of Food during the past few weeks is less than it was last year. At the same time I take this opportunity of again emphasizing to farmers the extreme importance of keeping for breeding all sheep suitable for that purpose.

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### Dogs (Feeding Experiments)

Mr. Rhys Davies asked the Secretary of State for the Home Department whether his attention has been called to two series of feeding experiments on dogs; and whether, in view of the suffering caused by these experiments, designed to produce by the same means the distressing symptoms of canine hysteria, he will in future refuse to sanction the duplication of such experiments under the Cruelty to Animals Act, 1876.

Mr. Ede: I assume that my hon. Friend is referring to experiments regarding the effect of the practice (now generally adopted) of treating flour with agene. I should not feel justified in disallowing these experiments on the ground that parallel experiments are in progress.

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### Vivisection (Experiments)

Mr. Viant asked the Secretary of State for the Home Department how many experiments on horses, asses and mules were performed under the Cruelty to Animals Act, 1876, during the year 1946.

Mr. Ede: These are the animals for which a special certificate "F" is required. The number of experiments during 1946 was 229 (190 "A and F"—*i.e.*, without anaesthetics, and 39 "B and F" *i.e.*, with anaesthetics). Our records do not show how many of the animals were horses, asses and mules respectively: generally speaking it is the horse which is used.

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### Scientific Manpower (Grants)

Mr. Blackburn asked the Chancellor of the Exchequer, whether, in view of the vital contribution which scientists, particularly those with university education, can make towards national economic recovery, he will give an assurance that despite the present economic crisis there will be no reduction in the financial assistance and priorities which are being given to the expansion of the capacity of the universities of this country to provide us with more scientific manpower as rapidly as possible.

Mr. Dalton: I have no intention of changing the scale of recurrent grants which I announced on March 10th last. As regards capital grants, my right hon. Friend the Minister of Works and I are fully alive to the considerations to which my hon. Friend draws attention, and hope that it will be possible to carry out the programme to which I referred in March.

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### National Parks (Animal and Bird Life)

Mr. Peter Freeman asked the Minister of Town and Country Planning whether it is his intention to prohibit all forms of hunting and other methods of unnecessary destruction of animal and bird life in national, nature or reserved areas and in the national parks as proposed in the recently issued Report on the Conservation of Nature.

Mr. King: Consideration is being given to the recommendations on this subject of the National Parks Committee and the Special Committee on Wild Life Conservation. They do not, however, suggest that the main responsibility should rest wholly with the Minister of Town and Country Planning.

Colonel Clarke: Is the Parliamentary Secretary aware that in their report upon national parks, the Committee, speaking in appreciation of the Lake District, actually say:—

"Visitors are increasingly sharing and enjoying the traditional sports and pastimes of the country. Chief among these is fox hunting on foot?"

Mr. Freeman: Will my hon. Friend do his best to protect wild life in those areas?

Mr. King: Among the recommendations in the Committee's Report is one that this matter should be considered by the Committee, and in the case of national parks by local committees.

## NOTES AND NEWS

### Diary of Events

Nov. 12th.—Meeting of the Editorial Committee, N.V.M.A., 36, Gordon Square, W.C.1, 2.30 p.m.

Nov. 12th.—Annual Meeting of the Scottish Branch, N.V.M.A., at Glasgow (George Hotel, Buchanan Street), 2.30 p.m.

Nov. 15th.—Annual Meeting of the Society of Women Veterinary Surgeons, at Church House, Westminster, S.W.1, 11.30 a.m.

Nov. 28th.—Meeting of the Royal Counties Division, N.V.M.A., at Reading (Caversham Bridge Hotel), 2.30 p.m.

Nov. 28th.—Meeting of the Southern Counties Division, N.V.M.A., at Winchester (Cadena Restaurant), 2 p.m.

Dec. 3rd.—Meeting of the Association of Veterinary Teachers and Research Workers (Scottish Regional Group), at the Glasgow Veterinary College (83, Buccleuch Street), 2.30 p.m.

Dec. 10th.—R.S.I. "Benjamin Ward Richardson" Lecture, at the Institute, Buckingham Palace Road, S.W.1: "The Transport, Handling and Lairage of Animals intended for Slaughter," by C. G. Allen, M.R.C.V.S., D.V.S.M., Chief Veterinary Officer, Birmingham. Professor Geo. H. Wooldridge, F.R.C.V.S., M.R.I.A., in the chair; 2.30 p.m.

Jan. 14th, 15th and 16th, 1948.—Meetings of Committees and Council, N.V.M.A. Committees at 36, Gordon Square, W.C.1, Council (16th) at the Connaught Rooms, Great Queen Street, Kingsway, W.C.2.

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### "The Veterinary Record"

**The Editorial Committee has appointed a Sub-committee with the following terms of reference: "To consider what steps, if any, may now be taken to improve *The Veterinary Record* as a scientific journal and as the organ of the profession."**

**The Sub-committee would appreciate the receipt from readers of suggestions for the improvement of the Association's journal in any respect. They should be addressed to the Editor at 36, Gordon Square, London, W.C.1.**

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### PERSONAL

*Births.*—McPherson.—On October 27th, 1947, at Howard Place Nursing Home, Carlisle, to Margaret, wife of E. A. McPherson, M.R.C.V.S.—A daughter.

Rollinson.—On October 30th, 1947, to May, wife of D. H. L. Rollinson, B.Sc., M.R.C.V.S., Asst. V.I.O., Reading—a son.

Smith.—On October 12th, 1947, at Singapore, to Eileen, wife of Lt.-Col. Douglas F. G. Smith, R.A.V.C.—a son.

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*Marriages.*—Bowditch—Scott.—On Saturday, October 25th, 1947, at Ashtead, Surrey, Edmund Barrett Bowditch, M.R.C.V.S., to Sheila Mary Shaw Scott, M.R.C.V.S.

Searles—Hart.—At Alloa, on October 23rd, 1947, Lt.-Col. G. Searles (retired) to Elizabeth M'Callum, Junior Commander, A.T.S., elder daughter of Capt. A. Hart, of The Anchorage, Ardnadam, Argyll, and the late Mrs. Catherine Hart.

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## THE VETERINARY EDUCATIONAL TRUST

*Ph.D. Degree for Mr. H. Williams Smith.*—It has just been announced that H. Williams Smith, M.Sc., M.R.C.V.S., a Wellcome Research Fellow of the Veterinary Educational Trust, has been awarded the Ph.D. degree in the Faculty of Medicine (Non-Clinical) of the University of London. This degree has been gained as the result of original work carried out at the London School of Hygiene and Tropical Medicine, which was written up in a thesis entitled "The Epidemiology of Staphylococcal Infections of Animals."

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Agricultural and Horse Show promoting associations are giving their support to the Veterinary Educational Trust which announces gifts of £100 from Exeter Agricultural Show; 100 guineas from Long Marston Horse Show and 75 guineas from Uxbridge Agricultural Association. Dog breeders have lately forwarded contributions towards the Canine Research Station.

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## EDINBURGH B.Sc. (VET. SCI.) GRADUATION

At the Graduation Ceremony held at the University of Edinburgh on October 25th, 1947, the following students of the Royal (Dick) Veterinary College had the Degree of B.Sc. (Vet. Sci.) conferred upon them: Banks, Peter Neil; Bottomley, Paul Jennings; Bownass, Robert Casson; Braithwaite, John Robert; Donald, Leonard Greig; Dyce, Keith MacFarlane; Fletcher, Robert Brian; Marr, Alfred; Robson, John; Snodgrass, Nigel; Wilson, James Cameron, and Wilson, John Mounsey.

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## ROYAL SOCIETY OF MEDICINE

Mr. W. A. Pool, M.R.C.V.S., has been re-elected an Hon. Secretary of the Royal Society of Medicine for the year 1947-48.

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## INCREASING FOWL PEST THREAT TO POULTRY STOCKS

### Further Control Measures

In a recent announcement it is stated that the Minister of Agriculture and Fisheries has decided that the spread of fowl pest can be controlled only by taking immediate and far-reaching measures to that end. Accordingly, an Order, entitled the Live Poultry (Regulation of Sales, Exhibitions and Movements) Order of 1947, has been made and is now in force. It defines as a scheduled area all that part of England between the south coast and the West Riding of Yorkshire and Lincolnshire and between the east coast and Derbyshire, Staffordshire, Worcestershire, Warwickshire, Oxfordshire, Berkshire and Hampshire. Within that area it will be illegal:—

(1) With certain exceptions to sell or offer for sale or to exhibit, either for show or sale, any live poultry, other than day-old chicks, or to move such poultry from any premises;

(2) for a dealer to gather live poultry together from more than one farm or holding; or

(3) to move any live poultry out of the scheduled area to any place in Great Britain outside that area.

The movement of live poultry, other than day-old chicks, into Scotland from any other part of Great Britain is also prohibited.

The exceptions referred to in paragraph (1) above permit a sale to take place on premises in the scheduled area to which no birds have been introduced during the previous 28 days, allow the movement of birds from such premises and permit the holding of sales in that area of poultry intended for immediate slaughter if such sales have been licensed by the Local Authority.

Copies of the Order can be obtained from the Ministry of Agriculture and Fisheries, 99, Gresham Street, London, E.C.2.

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## DANGER TO DUCKS OF CATERPILLAR-INFESTED LAND

In a recent letter to the Poultry Press, J. E. Wilson and R. H. Duff, of the Ministry of Agriculture's Poultry Laboratory at Eskgrove, Lasswade, Midlothian, warn poultry farmers of the danger of the practice, which has been widely adopted following upon the recent plague of caterpillars—particularly those of the large white cabbage butterfly—of allowing ducks access to the affected land in an effort to remove the caterpillars, which they eat greedily.

"After eating the caterpillars," say the writers, "the ducks cease feeding. Some become sleepy and stand about with the head over the body. They appear to be afraid to move, and if made to do so they walk unsteadily and stumble. Death occurs after a period of coma. In others twitching of the legs and wings occurs, followed by inco-ordination. Excitement is most marked, and birds run round in circles, finally dying in a paroxysm. In this type death occurs rapidly after the onset of symptoms. Ducks of all ages are susceptible, but mortality is likely to be higher in young birds.

"In the outbreaks we have investigated there is no question of the vegetables having been treated with any parasiticide, and chemical examinations for the usual poisons have been negative. Experimental feeding of live caterpillars has confirmed their harmful nature."

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## MILK (SPECIAL DESIGNATIONS) REGULATIONS 1936-46

### Tuberculin Testing by Private Veterinary Surgeons

### Acceptance of the Single Intradermal Comparative Test

Following the adoption of the single intradermal comparative tuberculin test by the Minister of Agriculture and Fisheries for all official tests of attested herds and, with the concurrence of the Minister of Health, its acceptance for all tests by veterinary inspectors of herds licensed for the production of tuberculin-tested milk, the Minister of Health has decided that, where tuberculin testing of herds for the purpose of the Milk (Special Designations) Regulations, 1936-46, is carried out by private veterinary surgeons, licensing authorities should be able to accept this test.

Accordingly, the Minister of Health has modified the directions given by him in paragraph 33 of Circular 1533, dated April 24th, 1936, to the extent that the manner of carrying out the tuberculin test of an animal by a private veterinary surgeon for the purposes of the above-mentioned regulations, may be either in accordance with the double intradermal test or in accordance with a single intradermal comparative test. Where the latter test is applied, the form of certificate of tuberculin test shall be as set out in Appendix I to Memorandum 197/Foods (January 1937) with any necessary adaptations.

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## MILK DISTRIBUTION SYSTEM INDICTED

The Association of Municipal Corporations has recently issued, and forwarded to the Ministries concerned, a report which embodies an indictment of the present system of milk distribution.

The major points of criticism are that there are long delays in the collection of milk from the farms and in its delivery to the consumer; that considerable quantities of milk on the point of souring and unfit for human consumption are being sent out by the dairies; and that the present method of bulking milk tends greatly to increase the quantity of tuberculous milk consumed by the public.

The vast increase in milk production during recent years is stated to be the cause of much of its unsatisfactory quality. Between 1939 and 1946 the sales of milk for liquid consumption rose from 789,000,000 gallons to 1,132,000,000 but, owing to material and other shortages, the period saw no corresponding increase in equipment either on the farms or in the dairies. Many farmers have been forced into milk production whose buildings and other facilities are completely unsuitable for the task.

It is held, also, that official policy, with its insistence on quantity, has led to the breeding of cows for volume rather than quality of milk. This has resulted in much milk being deficient in fats and solids other than fats, and hence to justifiable complaints from the housewives that their milk is thin and creamless.

As to delays in transportation and delivery, the report states that as much as four days may elapse between a cow being milked and the milk reaching the consumer, while as there exist milk producers, producer-retailers and distributors who are careless and inefficient, the report recommends that the public be once again given the liberty of choice of retailer and the distributor the right to buy his supplies where he will.

The report condemns the practice of bulking together the milk from many sources and herds for ease of transportation and handling. It quotes an instance from Manchester where tests of such bulked milk showed 75 per cent. to be tuberculous; some of this milk came from as far away as Cumberland and Scotland, but the bulking prevented any attempt being made to detect the sources of infection.

## THE DAIRY SHOW

More than 200 cows and heifers from Britain's leading herds were exhibited at the British Dairy Farmers' Association's four-day show held last week at Olympia.

The show was particularly noteworthy as, apart from being the B.D.F.A.'s first fixture at Olympia, it was the first show at which the Association barred all except "Attested" animals. The attendance constituted a record.

Of the nine breeds represented, Jerseys were the most numerous, totalling 45. Ayrshires, Dairy Shorthorns, British Friesians, Red Polls, and Guernseys were present in force, and South Devons and Kerrys, though fewer in numbers, were well represented. An outstanding event was the award of the Bledisloe Trophy to the Ayrshires, which secured 1,591 points for milking performance and appearance, the Dairy Shorthorns being reserve with a total of 1,481. The Ayrshire breed secured another triumph in that the individual challenge cup was won by Bargower Cherry 29th.

Goats were present in good numbers, and one bred and exhibited by Mr. J. R. Egerton has given 2,400 gallons of milk in four lactations. In the gallery 4,000 poultry and pigeons were on view, and a new feature was the rabbit section, with nearly 1,000 entries.

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## "Dairy Farming—Changes Ahead"

Mr. Clyde Higgs had many pertinent things to say on the above subject when he addressed the Farmers' Club on October 27th.

To-day, under the best conditions, it became increasingly difficult for any farmer to have more than a superficial knowledge of the many complications that beset the industry—from form-filling to veterinary problems—so he became more and more dependent on specialists—veterinary surgeons, milk recorders, milk testers, dairy experts, N.A.A.S. officials—right down the scale to economists. Even so, an adequate knowledge of every branch of the industry would be advisable and he looked forward to continuation agricultural education becoming available in addition to farm institutes and colleges.

Having dealt thus faithfully with the farmer—also with the agricultural worker—Mr. Clyde Higgs passed to the animal and said: "There are, I think, too many breeds of dairy cattle and certainly too many mongrels. The energy absorbed in the competition between breeds could be better used in lifting the standard of our dairy cattle as a whole. For efficient dairy farming a single purpose cow is the ideal. The dual purpose complicates an already difficult job. Let the beef men concentrate on their work, and let us think only of milk. One of my land girls gave a very complete answer to dual purpose by saying that she did not fancy meat that had been milked to death. In the future, when and if we get back to those selective days, nothing will do our home produced meat market more harm than mixing old cows and young beef. The self-contained herds will increase even if they entail a reduction of the cows in milk to accommodate the young stock. They are less prone to disease, they give more interest to the owner and are certainly more efficient producing units. As a suggestion for co-operation, it might be possible for one of a group of farmers to attend to all rearing matters, leaving the others free for milk production.

"Disease, it is said, costs stockowners £50,000,000 a year. I do not know how much of that is debited to dairying, but I do feel that our research efforts in prevention are on too small a scale. S.19 has proved itself against abortion, how long will it be before routine vaccinations can be made compulsory? Manpower and material are the limiting factors; if they could be overcome, the return in increased milk production would be very considerable. Attested and tuberculin tested herds continue to increase as they should with the attractive prices and simpler methods of testing. At times there are criticisms of the test; undoubtedly it improves, clear areas will soon be here and before long producers with untested herds may be getting less rather than the tested herds getting more. What of mastitis? We do not seem to progress mainly because of the pathetically little amount we spend on this rampant and terrible disease. Few farmers will admit to mastitis in their herds; they may own up to occasional thick milk or hard quarters cured by faith and patent medicines; actually there are very few free herds. One of the changes ahead that I should most like to see is control, or, better still, prevention of this insidious infection which is ruining our herds and materially reducing the milk supply.

### Artificial Insemination

"Artificial insemination makes controlled progress; even so, the membership of the Milk Boards Centres trebled in three months. Some doubt the morality of the process, they form a vigorous minority; most farmers, particularly those with small herds, are anxious to take advantage of the scheme. Apart from ethical considerations none can doubt the commercial value. The small farmer at moderate cost can command the finest blood in the country and this must result in a gradual uplift in the quality of our cattle. It may even reduce the number of breeds. The risk of disease caused by the promiscuous use of communal bulls is eliminated and the capital and food that are necessary to keep, say, 25 surplus bulls to deal with 700 cows under the natural system will be available for milk production. The tragedy of killing an old bull just when his value is known simply because he is unmanageable, or that his own heifers are coming round will disappear. I prophesy great developments in artificial insemination. How long can we do without compulsory milk recording? The select band of breeders who saved recording from oblivion for many years before the war have now been joined by others until nearly 20 per cent. of the cows are recorded with a substantial annual improvement. Over 7,000 lb. is the average yield of 400,000 cows. How far can that be increased? Is it wise to push the output too far—possibly at the expense of the cow's constitution? It seems to me that a long-living animal with the rearing costs extended over a number of years must be a sounder economical proposition than one with a short and merry life. Do not misunderstand me; I am all in favour of the highest efficient yield; present figures can doubtless be improved by better breeding and elimination of disease resulting later on in more milk from less cows. One change ahead to which I can see no practical objection, although there may be artistic loss, is the dehorning of calves either chemically or electrically. Those who have experienced the method will confirm that the animals are more placid and there are less injuries."

### Milk Production

Passing informatively in review feeding and housing (the erection of too permanent farm buildings was a mistake in view of the many changes ahead in cowshed design and operation), the speaker hoped for great reforms in milk production. The days of the hand milkers were numbered, not because it was a bad method, but the young entry was not interested, and who could blame them in a mechanical age? In any case, one-third of our herds were machine-milked, with the number increasing daily. Might we hope for development in the machines, which seemed much the same as 20 years ago? There were mechanical cooling plants, intricate and expensive beyond the reach of small farmers. Development should produce some kind of immersion cooler that could be plunged into the churns and keep the milk right.

By far the greater portion of our milk supply was pasteurized—sometimes not too well—when it undoubtedly became a greater danger than dirty raw milk. The majority of the medical profession was in favour of pasteurization, the Ministry of Food encouraged the process by handsome payments, and personally, after having struggled against the stream for many years, he now pasteurized his T.T. milk as an additional safeguard. There were many perils for good milk after it had left the cow. But pasteurization was no excuse for poor production—it simply made a safe milk safer. To do the job on every farm would cost too much and might lead to irregular results. The present method of hauling the raw milk a considerable distance before pasteurization at the dairy might well be improved by district collecting centres which could also separate surplus when they reached the happy stage of producing it. Undoubtedly there would be increasing control over production methods with an ever-widening circle of officials. Let them hope that they would all be under one authority and that they should be saved the necessity of being nice to half a dozen calling on the same day about the same subject.

Might they have some new names for graded milks? The tuberculin test was only a drop in the ocean of clean milk. Not so very long ago a local farmer was running about in a van labelled "Milk from Tuberculin Tested Cows"—he omitted to add that they had all failed!

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## EXPEDITING FARM REPAIRS

The Minister of Agriculture, Mr. Tom Williams, has informed a deputation from the Central Landowners' Association that arrangements are being made to increase the supplies of labour and materials available for repairs and improvements to farm buildings. New arrangements have been introduced whereby agricultural executive committees may sponsor direct to the Ministry of Works without reference to the Ministry of Agriculture applications for licences for work on farm buildings up to £1,000, instead of the previous limit of £500. As the great majority of applications are for work below £1,000 this should expedite repairs and improvements. Steel pipes for farm water supplies and tiles and machinery for drainage schemes were also to be increased.

## R.A. HUNT HUNTER TRIALS

The R.A. Hunt Hunter Trials were held at Larkhill, Salisbury Plain, on Wednesday, October 22nd, 1947. There were four events over a tricky course of about three to four miles including 16 to 20 jumps of various sorts. The Hunt event was won by Major J. H. Wilkins, R.A.V.C., on Cairngorm (The Viking) with 98 points. Brigadier G. W. E. Heath, Commandant of the School of Artillery, was second with 96 points on Bedstraw, on which he had won the event in previous years. There were some 30 entries, all subscribers, or farmers residing in the country hunted by the R.A. Hunt.

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## ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreaks.

Swine Fever:

*Lincs.* (*Kesteven*).—High Street, Navenby, Lincoln (October 30th).

Sheep Scab:

*Yorks.* (*W.R.*)—Newby Hall Farm, Newby-cum-Clapham, Lancaster (October 27th).

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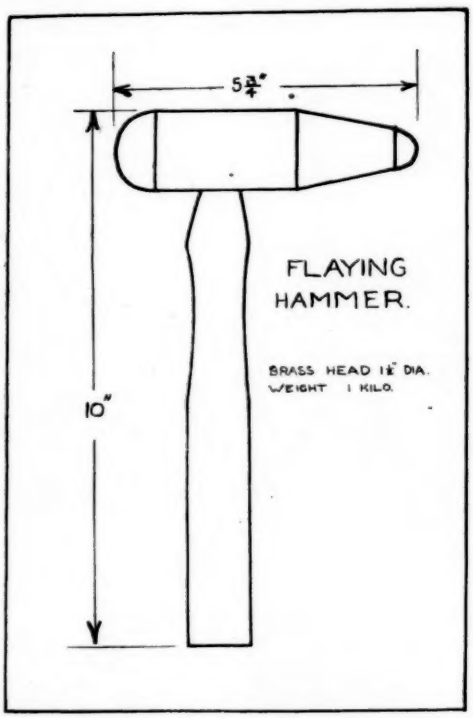
## The Hammer-flaying (Biffing) of Hides

[Contributed by the Tanganyika Department of Veterinary Science and Animal Husbandry.]

Hammer-flaying or biffing is by no means a new method of flaying hides; it does not, however, seem to have received the publicity, especially in Africa, which it merits. The hammer (see Fig.), which is made of brass or other non-corrodible material, weighs 2 lb. 4 oz.




In use, the usual opening-cuts are made in the hide and the hammer is pounded at the junction of the meat and the hide but slightly against the hide. This method is liked by native butchers. It is as quick and easy as knife-flaying, and it has the supreme advantage that no cuts whatsoever can be caused. After hammer-flaying, only the grosser tissué is removed from the hide prior to its being suspension- or shade-dried. On no account should the flesh side of the hide be thoroughly cleaned with a knife, as this will cause scores which it is the purpose of hammer-flaying to prevent.

This method is not used on skins as it is said to cause damage to their fibres. It has, however, been widely used in Tanganyika Territory for several years for the flaying of hides.

[This method has been tried in large meat works. The extra time and energy involved has been out of all proportion to the increased value of the hides, but where the export of hides is of greater importance than the production of meat and where the art of flaying is of a low order, the method advocated above is no doubt advantageous.—*Editor.*]

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## RE-EQUIPMENT REQUIRED FOR AGRICULTURE

*The Times* reports that Lord De La Warr, speaking at the Royal Institution recently, said we should now be preparing to face the strong possibility of real hunger in the country during the next 12 months. He hoped he was wrong, but on the facts and figures available to the public it was not easy to arrive at a different conclusion.

Our soil was capable of producing more. Only four years ago, at the height of the war, the national tillage area was 1,500,000 acres more than to-day. There were more pigs, more sheep and about the same number of cattle. But even then who could take a drive through any part of the British Isles and not see field after field that was under-producing?

The main trouble was the national unwillingness to realize that this was no crisis with which we were faced but a long term, if not a permanent, change. Whatever our shortages and difficulties, the countryside must be re-equipped—entirely re-equipped—with new buildings, houses, electricity, water and transport. Agriculture needed the best that science could give it.

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## B.M.A. COMMITTEE ON NUTRITION

The Council of the British Medical Association announces the appointment of a special committee to consider and report on nutrition and current nutritional standards. A similar investigation was made last by the B.M.A. in 1933.

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## A CENTRAL LIBRARY OF THE WORLD

"A project for a Central Library of the World," observes *Nature* in its issue of October 25th, "drawn up during the German occupation of France, with the dual objects of providing more effectively for the preservation of the documents on which human culture rests and making their utilization easier and more widespread, is of interest in relation to the programme of work now contemplated by the United Nations Educational, Scientific and Cultural Organization, which already includes a library organization. Of the seven stages in which it was visualized the project would be achieved, the first, that of bringing together in France a limited number of initiators, both French and foreigners resident in France, had been realized; and a second, that of formulating a concrete project and inviting the collaboration of a number of well-known French personalities, was in progress when this pamphlet was issued by the French Association for the Study of Bibliographic Questions (7 rue des St.-Pères, Paris 7), as was the fourth stage of inviting foreign co-operation. The further stages include the formation of an international committee and, after study of the problem by that committee, an international convention to set up the appropriate organization, appoint the members and to decide on the official language to be used.

"The preliminary scheme summarized in this pamphlet contemplates the establishment of the organization, to be called the Bibliothèque Centrale du Monde, by a statute guaranteeing the absolute inviolability of the headquarters of the Organization, which is to be regarded as a world reserve; the territory where it is located should belong to no nation. The organization would be directed by a supreme council, and administered by an administrative council. Its director would be provided with a general secretariat and would also be responsible for the administrative, principal and auxiliary services. Besides ordinary members of council, there would be from three to ten times as many corresponding members. The supreme council would function largely through two permanent commissions, one of which would be responsible for the study of projects. The chief services contemplated include the deposition and distribution of documents, and diffusion of information. In particular, it is suggested that the organization should provide at its central depot a universal primary bibliography,

and should endeavour to secure the creation of a universal copyright system. It seems that with the establishment of the United Nations Educational, Scientific and Cultural Organization, the proposals should, in the first instance, be considered by that body, presumably at the instance of one or other of the national delegations."

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## MINISTRY OF AGRICULTURE NEWS SERVICE

### Cattle Breeding

In some quarters there is a tendency for writers and speakers to decry the standard of British cattle. Attacks like this may emanate from lack of full knowledge or a desire for notoriety. Undoubtedly there is room for improvement: it would be a peculiar industry if there were not; but considering the density of our cattle population, the infinite variety of our farming methods, the long years of depression followed by war-time difficulties, we are becoming more cattle-conscious and are making substantial strides towards better livestock.

Through the State Veterinary Service, every farmer—large or small—has within his reach that technical knowledge so essential in such a complicated business as animal husbandry. The veterinary surgeon's duty is not limited to routine tuberculin tests, inspections and vaccinations. When he is on the farm for these purposes, he is always ready to discuss the farmer's disease and allied problems. Supporting him are the laboratories, where research specialists are working on the solution of abstruse problems, so that one day they may offer simple cures or, better still, preventives. A few moments' thought on the difficulties of tuberculosis, foot-and-mouth disease, abortion and mastitis, will show that the work is not simple.

Milk recording makes headway and is indispensable in pedigree and grading up herds, but many dairy farmers are still content to guess their cows' yields and buy on appearance instead of facts; many show results, too, depend on the judges' discretion unaided by production records. Some say that the cost is too high—even at the present subsidized figures—forgetting than an annual improvement of 50 gallons in one cow's yield will mean £5 profit. The cost of producing the first 400 gallons is pretty stable. The animal must be housed, milked and cared for, and she consumes a basic ration to keep her alive. It's those extra gallons that bring in the profit. And apart from fortunate episodes with flying herds, the only sure way of improving the milk yield is by regular recording and continuous culling. Private recording is better than nothing and can be an aid to management and breeding. Official recording is a worth while investment in any dairy herd in which economy in management and production is attempted.

Artificial insemination will have far-reaching effects on our cattle standards. Fortunately the problem has been approached cautiously and some years must elapse before spectacular results are achieved. As things are, small farmers in some areas can introduce into their herds, at a moderate cost, some of the finest available blood. Even the large herds—where a bull is the simplest and cheapest method of everyday breeding—can be improved by intermittent artificial insemination. For under normal conditions many farmers must sell their bulls long before they are fully proven.

The British livestock barometer is set fair and rising—the schemes mentioned will help to keep it steady. But its ultimate setting depends, as with all other jobs, on the farmer's individual efforts.

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From 1 to 3 per cent. of the swine slaughtered in our packing houses have brucellosis. Sometimes this disease does no harm and causes no economic loss; sometimes it destroys all chance of profit from the herd.—*Vet. Med.*

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### Weekly Wisdom

*There is no defence against an unknown factor.*—"Times" Rugby Football Correspondent.

## CORRESPONDENCE

*The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the N.V.M.A.*

**Correspondents should write as briefly as possible and letters should not exceed 350 words.**

### DEHORNING OF CATTLE

Sir,—It is becoming increasingly apparent to those whose work brings them into contact with cattle in general, but in particular with dairy cattle, that a large proportion of the injuries to which they are subject is a result of horning, and that time and money spent in removing the offending weapons is usually well repaid,

So far the methods used have not been ideal. The use of chemical caustic agents often produces irregular results, and the satisfactory application of these agents is not easy. Surgical removal of the horn bud, while providing a 100 per cent. efficient method, is time absorbing. It is therefore not superfluous for those who, like myself, have not seen the method employed, to refer to a well-illustrated article entitled "Easier Dehorning" appearing in the *Farmer and Stock-Breeder*, October 14th, 1947, page 2319. In this article are described the indications for and method of use of an electrical cautery instrument for the disbudding of calves at about one month of age, from which it would appear that it is a method which is both rapid and efficient in removing the troubles which result from these keratogenous appendages.

Yours faithfully,

127, Histon Road, Cambridge. Peter Kiddle.

*October 18th*, 1947.

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In the article to which our correspondent refers, "A. B. L." indicates that Mr. J. E. Rowe, Whalley Farm, Andoversford, Glos., has perfected the use of an electric cautery which has the advantages of eliminating the need for greasing and of causing no bleeding. Moreover, scissors are seldom needed.

"Caustic potash was used for dehorning calves up to about three years ago, when Mr. Rowe saw a suggestion for using an electric hot iron put forward in the *Farmer and Stock-Breeder* by Dr. Joseph Edwards, Head of the Animal Husbandry Department of the Milk Marketing Board.

"After some search a Rawlplug soldering iron of the necessary round section was found and adapted by trial and error to the measurements shown on the diagram (see below). To-day electric dehorning of all calves is just a simple routine job requiring very little time and involving no fuss or elaborate preparation.

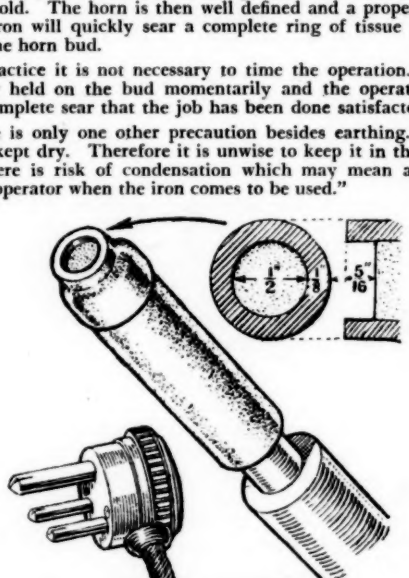
"Two dabs of the iron on each horn bud—from left to right, and then repeat—and the job is completed.

"The iron is plugged in at a 2-amp. point while the 'patient' is being haltered and brought in. Safety demands a 3-point plug or else an outside form of earthing must be arranged.

"It has been found that the best age to dehorn calves is at about a month old. The horn is then well defined and a properly adapted electric iron will quickly sear a complete ring of tissue around the base of the horn bud.

"In practice it is not necessary to time the operation. The iron is merely held on the bud momentarily and the operator can tell by the complete sear that the job has been done satisfactorily.

"There is only one other precaution besides earthing. The iron must be kept dry. Therefore it is unwise to keep it in the buildings where there is risk of condensation which may mean a shock for calf and operator when the iron comes to be used."




The sketch shows the business end of the electric iron. The diagram gives measurements and the plug is to remind of the necessity for earthing.